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FACTORY control is epitomized in these photographs. Above appears Reuben Hill, factory manager, Detroit Lubricator Company, whose desk is a focus of production problems. Below, Richard A. Feiss, general manager, the Clothcraft Shops, is studying his unique production schedule. By conferring over an order book page enlarged to blackboard size, President Carpenter, Fireproof Furniture and Construction Company, secures cooperation among his foremen

THE FACTORY MANAGEMENT SERIES

EXECUTIVE CONTROL

BUILDING UP THE ORGANIZATION—SELECTING AND TRAINING MEN—REORGANIZING UNDER SCIENTIFIC MANAGEMENT—ESTABLISHING WRITTEN STANDARD PRACTICE—MANAGEMENT DUTIES, DECISIONS AND POLICIES

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Part I

BUILDING UP THE ORGANIZATION

AUTHORITIES AND SOURCES

FOR PART I

Chapter I. Contributed by Mr. Feiker. The general point of view corresponds to that taken by A. W. Shaw in his book, "An Approach to Business Problems," which in turn is a statement of the editorial viewpoint of the A. W. Shaw Company on management. Illustrative material has been drawn from discussions and correspondence with many manufacturers, and the chapter is a composite of their several policies as the writer interprets them. Many of the companies referred to could not be named without violating a confidence. Concerns in the following lines, however, are among those to which reference is made: electrical manufacturers (the General Electric Company and a concern in the Middle West), automobile manufacturers, an implement manufacturer, a piano factory, a navy yard, and several metal-working factories in America and abroad.

Chapter II. Also contributed by Mr. Feiker in collaboration with Mr. Murphy and Mr. Porter, and in counsel with various industrial engineers who hold advanced positions in the development of organizations. Among the concerns, authorities and lines to which reference is made are the National Cash Register Company, the Union Pacific and Southern Pacific Railways, Franklin Automobile Company, the work of Frederick W. Taylor and Harrington Emerson, the machine-tool industry, a manufacturer of electrical devices, and others.

Chapter III. Contributed by Mr. Feiker in collaboration with Mr. Porter. Because of the elementary stage in which the training and development of executives still remains, the material has necessarily been gathered widely from many companies. A few of the plants and lines from which points are drawn are the manufacture of office appliances, sanitary ware, cutlery, agricultural machinery, metal furniture and electrical equipment, publishing, the American Telephone and Telegraph Company, and the University of Cincinnati.

Chapter IV. Contributed by C. Bertrand Thompson, lecturer on manufacturing at Harvard University, from his own study and practical experience in various installations of the Taylor system.

I

PROFIT—THE FINAL PROBLEM

IDEAS eventually determine the growth and success of any enterprise. But ideas may also cripple a business. Every concern has what may be called a rate of flow. If the business is too rapidly supplied with new impulses, the whole machinery for turning out the product clogs and stops. It is no secret that one old established business is just recovering from an influx of ideas. The man who had charge lived too far ahead of the practical routine of his trade. His ideas were splendid but he tried to get them all started at once. He over-financed, over-developed and over-managed his business and the result was a catastrophe. His ideas had choked the enterprise.

Balance is the master quality in a profit-making business. No enterprise can run at a profit unless the man at the head realizes his responsibility and establishes a balance between cost, quality and service for his conditions. The need for men with the balanced viewpoint is seen in large businesses and small. Every idea calls for the profit test—and the application of untried ideas requires caution, in order not to overthrow the balance upon which the momentum of the enterprise depends. What is essential, where to begin, how a change at one point will alter the other relations of the business, are the questions with which the manager is most concerned. The advertising manager whose first thought is for an impressive letterhead with his name on it, has the same wrong perspective on his particular work as the head of a public service corporation who clings to the old doctrine that consigns the public to the lower world. To maintain the balance between cost, quality and service is the real work of the man, whatever his title, who directs the policies of a business or its producing departments.

This simple approach to the general manager's problem seems particularly necessary in the manufacturing business. So many important changes and so many new factors have been introduced into the production of commodities that it is easy to become confused and to mistake some side problem for the main one. A man goes into a business with the expectation of making a profit for himself. To be successful he must produce and distribute his particular commodity so as to earn a profit above all manufacturing and distributing costs. Profits are the test of a successful manufacturing program. Fine buildings, modern machinery, precise methods, a splendid organization, in themselves are essential; but they are all simply means to an end. If with them a manufacturer can not produce a product attractive enough in quality and service so that his customers will exchange for it money enough to make him a profit, he has earned neither the title nor the rewards of a sound manager.

HOW TO ANALYZE A MANUFACTURING PROPOSITION AND ESTABLISH FUNDAMENTAL POLICIES

THE activities of a manufacturing business may be divided into three broad groups—production, distribution and administration (Figure I). Starting with the purchased raw materials for a product, the activities of production have to do with changes in its form. Distribution similarly deals with changes in place or location and administration concerns itself with all those activities of a business which facilitate these changes of form and of place.

Whoever lays down the policies of a manufacturing business today should occupy a position above these three groups of activities internal to the business, and by establishing a proper balance between cost, quality and service, should enable it to prosper in its external relations—its contacts with customers, competitors, public opinion, law and government.

When a general manager can see this as his relation to the enterprise, he is in a position to give proper weight to the various internal and external considerations and to establish wise policies governing (1) the building and maintenance of the plant and (2) its operation. These the factory manager in his turn can work out in detail (Figure II), standardizing the routine and keeping his organization adjusted to the variable and unforeseen factors.

It is evident that there is still something for the factory manager to do. Different factories can succeed and do succeed with quite different policies. A method of approach can only suggest a general plan of analysis; it cannot supply the deficiencies in the man who is to carry them out. The right relation between cost, quality and service, for example, is translated by Henry Ford for one group of automobile buyers and by Henry B. Joy for another group. The manager in each case has laid down policies that suit production to the chosen field. A jeweler who sees his market among working men and lodges may be just as successful in developing his business as another who by location, store equipment and special service appeals to the custom of some exclusive West End clientele. And just as different business men have adjusted each his scheme of business to his customers, so they have also established policies which

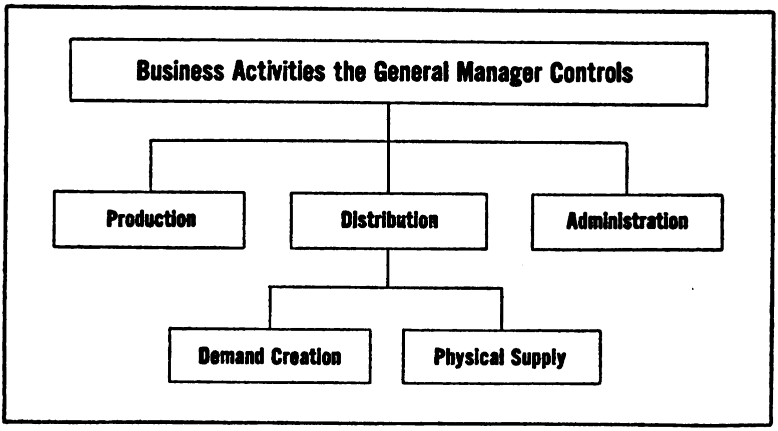


FIGURE I: The first step in analyzing the duties of management is to divide the business into (1) the manufacture of the product, (2) the distribution of the product, and (3) administration. The administrative activities of a business are its accounting, purchasing, costkeeping, financial and other facilities and systems, and should be conducted entirely for the furtherance of honorable and profitable manufacture and sale

suggest correct relations to competitors, public opinion, law and the government.

Once the general policies of management have been established with due regard to the balance between the three factors of cost, quality and service, comes the necessity of extending these policies in detail to the plant and operating sides of manufacturing. The man at the head of the business, who has been called the general manager, puts these general policies into effect on the production side through the man in charge of that department, whatever his title, but who may be called the factory manager. *Cost* and *output* are the two guiding words in shaping internal factory policies, within the standards set for quality and service. The factory manager's job is to get the tonnage or the yardage or whatever the unit of output, at the lowest unit cost consistent with quality and service. All other considerations are supplementary to these. He will be a balance wheel on the production machine, not letting investment get ahead of output or machine equipment charges be greater than costs in hand labor might be. He will translate the demand for efficiency into a policy of getting the most out of materials and money, men and machinery, with his eye always on the human factor, the investment factor and the final cost factor.

HOW FACTORY MANAGERS ADJUST THE CONFLICTING CLAIMS OF QUALITY AND ECONOMY

THIS is easy to say. When it comes to performance, the overlapping of the factors with which he has to work, in the words of an automobile plant manager, make his desk look like the small end of a funnel through which come all the problems of the shop. The factory manager works with plant and equipment, machines and tools, raw materials, labor and methods. In adjusting the relations among these various factors, cost, output, service and quality all enter. So far as the factory manager is concerned the buildings in which he works enter his costs primarily as a direct investment charge. From an "unbalanced" point of view he might believe that a tent, therefore, because it was cheaper, would fill the requirements of a roof as well as a more expensive building. But not many factory managers today take the viewpoint that any building will do. Tumble-down buildings, with dirty corners and slovenly housekeeping in general, bringing up grave questions as to care of equipment, cost of lighting, desertion of labor and loss of public good will, are reflected in lower quality of product and higher final cost. So the factory manager has a very real interest in the condition and maintenance of his buildings aside from the rent alone. An overlapping factor in costs, arrangement of the buildings, is of even greater importance. A badly arranged building can double handling charges. Every factor in production is thus interwoven with many others, and any short-sighted policy results in

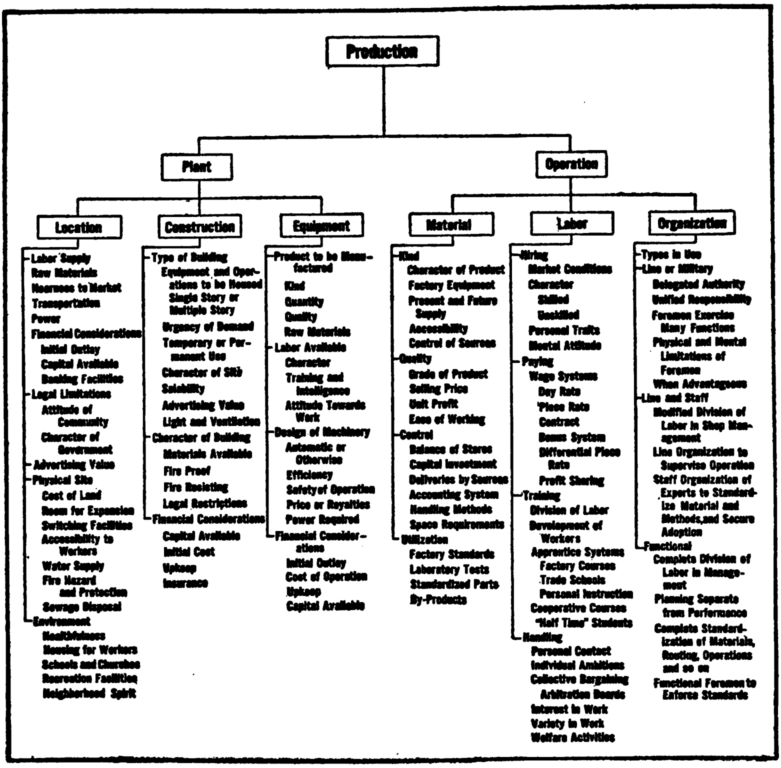


FIGURE II: This analysis of production problems as well as the previous chart, present the viewpoint of A. W. Shaw in his book "An Approach to Business Problems." The items listed suggest some of the considerations on which sound policies touching location, construction and other problems should be based

a shift of the balance beam, by which cost goes up or quality or service falls, with a resulting discrepancy in the manager's final calculation (Figure III).

Investment in machinery is another factor that must be balanced with output and unit costs. A well-known engineer claims that hundreds of factories are over-equipped. Factory managers

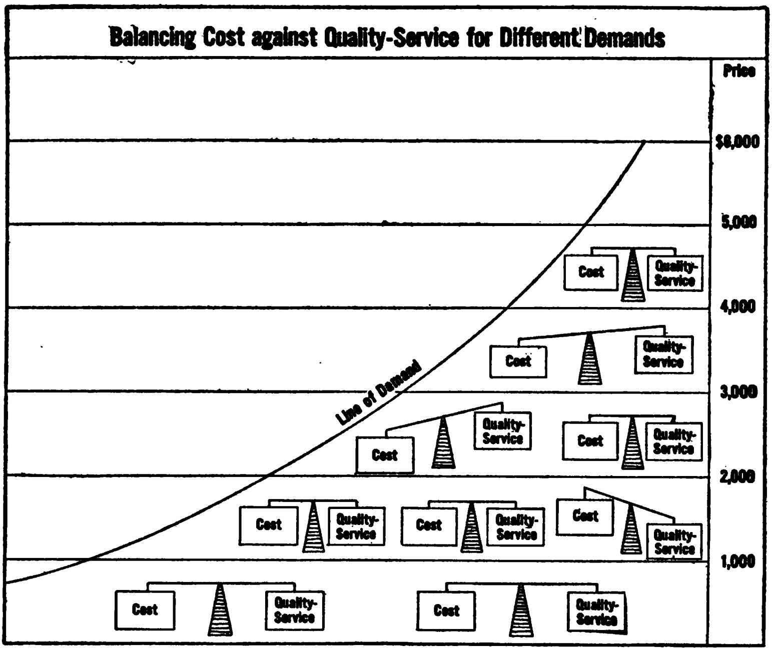


FIGURE III: The factory manager's concern is that what he produces shall have such quality and service in proportion to its cost that the sales manager can profitably distribute it at a price which the consumer is willing to pay for the quality and service delivered. This sketch develops these points graphically. Automobiles are marketed at various prices from a few hundred dollars to several thousand per car and the demand for the lower priced cars is much broader than that for the expensive ones, as indicated. The sketch suggests two cars, both good values, marketed at about $800, three competing cars marketed at about $1,700, two of them well balanced as to cost and quality-service, but the other priced too high for the quality delivered, and higher priced cars, two of which are delivering more quality than they can well afford to at the price. Either of these blunders—to give too much or too little—threatens the life of the producing concern

like mechanisms. They sometimes forget that mechanisms cost money to install and operate. In one piano factory small parts were needed—pins, screws and so on. Without figuring how many he could use, the factory manager bought an automatic lathe. He soon discovered that the machine did the job so well that three weeks in the month it was idle. He lacked the work to keep his investment busy. On the other hand, an automatic lathe may set the pace for an entire chain of operations and so be a very real aid in increasing output and reducing costs.

Aside from the output and cost factors to be considered in connection with shop equipment, the factory manager today has found it necessary to consider many construction and machine problems side by side with the man problem. In Cincinnati a manufacturer set up an automatic machine in which sheets of burnished tin slid down into dies directly in front of the operator. So many accidents occurred, in spite of precautions, that the machine became a shop hoodoo. Finally, an outsider, stooping to watch the machine, discovered that every time a fresh sheet slipped into place it flashed the light from the window behind the operator into his eyes. Literally the continual flashing had hypnotized the operator. By turning the machine so that the operator did not get the reflection from the tin sheets, the superintendent put the "hoodoo" at rest.

It is situations like these that bury the factory manager in detail. The danger is that the details will hide the main point and that the relation between cost and output will not be respected by the consulting specialist, who might see this problem, for instance, only as "accident prevention." The main point at issue is not how elaborately or carefully shall a machine be guarded, not how near scientific perfection the shop can operate regardless of the cost, but how can sheer carelessness be overcome, accident and insurance costs be reduced, the good reputation of the plant among both workmen and customers be maintained, and thus a balance kept between cost to produce and quality delivered.

Similarly, materials demand balanced consideration. Cheap pine for making chests for boat tackle in an eastern navy yard cost twenty-five dollars a thousand. White pine, at sixty dollars a thousand, it was recognized, would make a better chest, because it would not warp; but it was thought that the white pine chests would cost too much. However, a trial lot of a hundred was put through made of the white pine, with the surprising result that while the material cost per box was higher, the total cost per box was lower. The material worked up better and the labor cost per box was enough smaller to offset the higher raw material cost.

This is a simple example of the well-known fact that first cost is not the final cost of materials which enter into the making of a product. The factory manager has many problems involving material to consider from the balanced viewpoint of cost, quality and output. Traditional first costs hinder the reduction of many high total costs. Possible economies in buying, storing and processing material are found so easily in the average factory, that outside consulting experts often count upon their results in the stores and material sections to win support for them in further reorganization work.

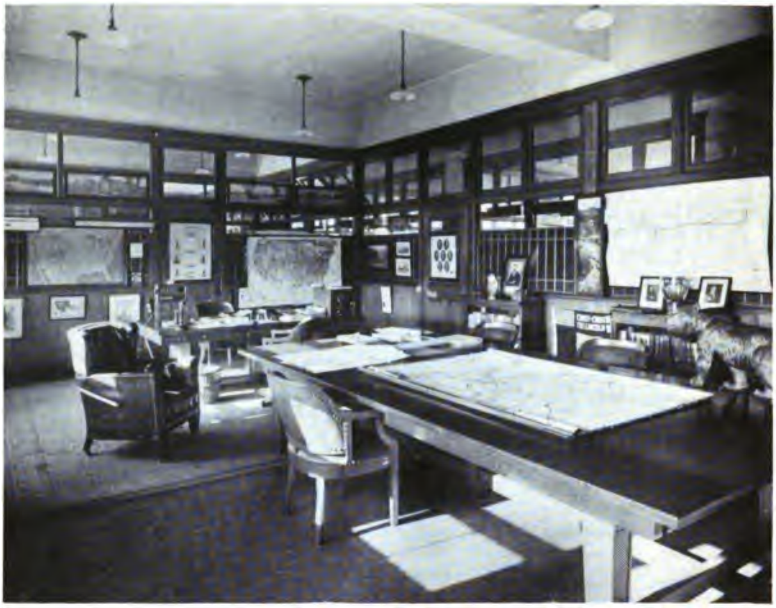
Too much capital tied up in stock is a common case of unbalanced management of materials. In one concern the total accumulations in unnecessary lumber stock brought enough when sold to make a big hole in the first year's costs of over-hauling the plant. Material for discarded models, extra stocks for parts only needed in small quantities, material relatively too high in quality for the total cost of the product, all were sorted out of the lumber yard and sold.

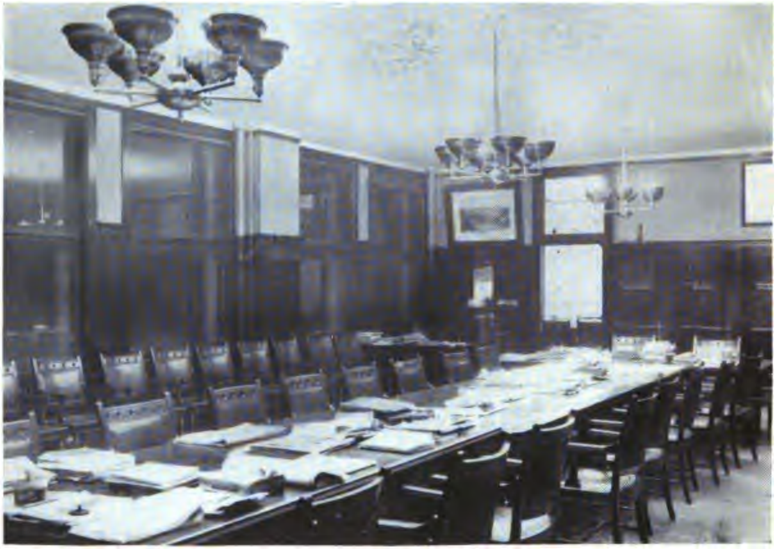
LOOKING AT LABOR AS THE TIME FACTOR WHICH DETERMINES THE PRODUCTIVENESS OF THE INVESTMENT

THAT problems of labor are found interwoven with the problems of construction, arrangement, material and machinery has been seen. Few factors in manufacturing, indeed, can in the final analysis be considered apart from labor. The general manager or board of directors may lay down broad policies particularly with relation to those phases of labor which touch widespread social conditions in the community or nation. The factory manager is responsible for the interpretation of these policies in getting out the goods. He must meet the problem of cost of doing work.

One important incentive to the invention of highly ingenious machinery in America has been the high cost of workmen. Factory methods in France, for example, are said by observers to be far behind those in America, considered from the viewpoint of the conservation of time and energy. In striking his balance of cost, quality and service, labor time is relatively so

These offices symbolize the freedom from detail which management needs. Above appears Henry Ford at his desk. Below is the office of Theodore N. Vail, president, American Telephone and Telegraph Company, designed to accommodate a directors' meeting or conference, and through the telephone, in touch with an organization as broad as the continent





An executive workroom designed essentially for service is the office of Henry B. Joy, president of the Packard Motor Car Company. Not only the modern appliances, but the wall decorations and equipment indicate the owner's intense interest in the routine of his business. Below appears the famous board room at 26 Broadway, where the directors of the Standard Oil Company meet cheap that to the Frenchman time studies seem futile. Similarly it has not seemed urgent to invest in specialized machinery to save labor. The inclination has been to assume that the special, high-priced machine cannot compete. In this country, on the other hand, specialization in machinery, in organization, in hiring, training and handling labor is made necessary by a relatively higher wage scale as well as the demand for greater output. Careful observers agree, however, that the adjustment between cost, quality and service has been so well maintained that the sought-for combination of large output and low unit costs are found in many of our industries, even under the higher wage scale.

While specialization is now being carried further into the methods of hiring and training men than ever before, the average factory manager's labor problem still revolves around getting more work done in a given time after the man is hired. The factory manager translates the broader problem of labor management into the definite task of using time more profitably. Time costs money. The more time a piece of work takes, the more expenses of every sort cling to it. Therefore, men are picked and paid for fitness and capacity, because when they get started on a piece of work they save indirect costs by doing it quicker, without costly supervision, forcing or driving. Processes and machines are analyzed to see if there is a quicker, better way to turn out the work; and organization methods are developed not to hurry work in the sense of skimping it, but to eliminate the useless time-consuming operations and motions.

KEEPING ADMINISTRATIVE SYSTEMS SIMPLE AND WELL ADJUSTED TO THE SIZE OF THE BUSINESS

SMOOTHLY to carry out and control this organized group of plant and operating activities called production, the factory manager needs administrative machinery. And here again he has the opportunity to separate the essential from the non-essential. On the one hand, he may carry in his head all the plans, schedules and records, and all his methods of control may be personal. He may belong to that class of managers who are rather proud of the fact that they can't get away from their business. Or he may overload his work with cards and forms and miscellaneous facts, under the mistaken notion that they will run his place for him.

Somewhere between these extremes each manager finds his own ground and fits methods to conditions under the direction of his guiding principles. The manager of an electrical appliance factory explained his cost system laughingly as "spasmodic." "Labor and material costs are assembled on every order which goes through the factory," said he, "but we total the final costs only when we have some particular need of them. I can't afford to keep clerks figuring costs I might never use."

His factory is a small one. He has recognized that a cost system has two functions: it can control expenses and it can keep histories. He cannot afford to keep histories of all the details of his business. On the other hand, he is close enough to the details himself to check pretty accurately how the costs are running. Another manager in a larger factory, or in one where orders are more varied in character, would probably need more detailed figures to control expenses.

This is merely one illustration of the general policy that in establishing any routine method of doing work, the cost of getting the work done must be in proportion to the cost of the work itself. The factory manager could as well afford to provide himself with a magnet on a handle and pick up nails on his daily rounds of the plant as to establish a twenty-dollar-a-month routine to check a possible total loss of ten dollars. Yet such things have happened.

What has been said of costs is merely typical of administrative machinery in general. Before deciding on some far-reaching reorganization it is always necessary to get outside of the details involved, and see the whole plan from a detached, common-sense point of view. Just as one horse is more easily handled than a six-horse team, so the small factory does not require the same amount of administrative harness as the larger one, and the manager of the growing plant sometimes encounters the difficulty of being too big—too unwieldy. There is apparently a relation between size and efficiency. So well administered a concern as the General Electric Company has started a process of decentralization, so that, instead of huge factories with tremendous departments, it will have smaller factories, each with a responsible head and smaller departments. Instead of having, for example, one large drafting department, one large engineering department, one large production department, and so on, for unlike classes of commodities which the company makes, members of these administrative departments are grouped in the building with the operating departments for some particular commodity or group of similar commodities. So there is the turbine shop with its machine and erecting shops, engineering, drafting and production departments under one head, and the heating and other appliances are similarly grouped in separate factories.

At the same time the big industries are laboratories of methods and practice for smaller factories. Large output magnifies, and so reveals wastes otherwise neglected. Volume of work and waste warrants setting a man to finding out the reason why; and the reports of his findings in the large organization, becoming as they are more and more professional in character, are published for the advancement of the whole industry. So every concern, big and little, peers into the industrial microscope and learns from others.

WHAT TO DO FIRST IN REORGANIZATION AND HOW TO STANDARDIZE ROUTINE

RECOGNIZING all these problems and conditions, the main thing in factory management, after all, is to make a beginning in betterment. No big plan is gotten under way as a whole. The first step to take is to choose some small section of the big plan to put into effect. One manager who had an old plant to reorganize for his company spent three weeks analyzing the conditions, then made a general chart of organization, listing the duties of the men he had to work with. Then he tackled the purchasing department as the one which needed immediate attention. From this he went to checking up the payroll, then to rearranging the machinery, and finally to working out a routine schedule.

In another case the first step to take was finding out which of the products being made were turned out with a profit. It was found that out of a group of products three were actually carrying the burden of the business. The rest were eating up profits.

The money-losers were sold, patents and all, to specialty makers. Two were dropped completely and the patterns destroyed. The factory building was sold and a smaller and better arranged factory bought with the proceeds. Manufacturing of the profitable lines then proceeded successfully.

When the lines to manufacture are determined, schedules and goals of performance on the basis of output and costs can be set and the detail policies of management carried out, as has been described in previous volumes. Shortly the head of production finds himself master of a smoothly running mechanism of buildings, machines and men, shaping materials into salable products according to standard policies and instructions.

One factor alone remains—the variable and unexpected. "When orders are coming in regularly, men contented and the routine running smoothly, *look out for squalls,*" says one manager. The world of demand, no less than the organization itself, is always changing. Readjustments, decisions in uncharted fields, emergencies—these are the desk problems of the chief; and they bring out the real qualities of management. There are dozens of everyday problems to settle under the steady conditions. But the test of any organization comes when the unusual happens. The manager must not only create, maintain and animate an organization in the broadest sense, he must act as its sales manager. Plan boards without orders hung on their hooks are rather useless pieces of furniture.

II

WORKING OUT AN EFFECTIVE ORGANIZATION

FITTING together men and work in a manufacturing plant is usually a steady remodeling process. The manager deals not with business as it might be, but with conditions as they are. The object and end of organizing, it may be repeated, is not to form a beautifully symmetrical organization with circles and lines of authority worked out in an ideal plan, but to keep John and Carl and Tony and Dan working together in a way at once mutually economical and profitable.

To organize, therefore, usually means to realign or readjust men already at work in order to better costs and output. Organization in most cases is reorganization and the manager who successfully weeds out wasteful practices in his establishment never forgets the first two letters—the old ways he must overcome as well as the new ones he must introduce. He is working with men—human beings like himself—men who think about as he does, men who go home at night to live practically as he does and whose human reactions are much the same as his. Every manager who has opened up a new plant or reorganized one already in operation knows that the settled habits and views of his executives and men are to be dealt with, no less than his own ideas and plans.

Obviously the first step to take before overhauling an existing organization or planning a new one is to study this human-nature side of the problem. Here the difference between the art or personal side of management as distinct from the scientific or impersonal side becomes evident. Some managers seem to have a natural fund of human understanding—a knack of knowing the other man's viewpoint and making natural readjustments. Some attain their leadership by the force of genius; others by the strength of example. There is no way of saying which is best, because in the average business the organization is successful only so far as it reflects the personality and character of the head of it. In the one-man business, the natural leader may carry the torch of enthusiasm in his organization; in the corporate business the directorate will act wisely when it blends individualities under the leadership of policies to which many have contributed their best thought. After the organizer and head of the business has made an analysis of the men he has to work with, therefore, he should inventory his own limitations and special powers. The type of organization which the manager should choose is as much a matter of fitting the methods to himself as it is of adapting them to the men who work with him in his business.

At this point much so-called efficiency work breaks down. A mechanism of management may be installed by a consulting manager without regard for the natural attributes of the permanent head of the business, who pays the bills. So installed, the method of organization will survive only so long as the man who furnishes the power for it stays on the job. When he leaves by the front door, the old abuses which he came to correct, and did correct, come trooping in again at the back door. Not that there are no principles which can be transmitted from manager to manager—far from it. The important point for the manager to realize in his task of making his plant a permanent unit for the purposes of his enterprise is that he has a natural way of working and that his way has its bearing on any methods developed under him or by an outsider. Reorganization usually involves a radical change in the viewpoint of the management. If the chief will not or cannot conform in all essential ways to sound principles, the latter must of course be compromised to suit his peculiarities.

From his own experience, every man can judge the persistency of this natural way of working. Some see figures in graphic form more quickly than in tables. To the man "raised on figures" from the accounting side, tabular analyses are just as effective as charts. One man will view his business as a salesman, another as an engineer, a third as a keen buyer, a fourth as a capitalist. The end of management is the same for all, the principles of management equally are universal, but their individual *conceptions* of management are vastly different. Each must supplement himself in his organization, and make such adjustments that it, as a unit in which he himself is included, fits his business aim (Figure IV).

One manager who is known throughout the world as a genius, a master mechanic and an improver, maintains a desk which is a by-word in his factory. To an orderly, methodical mind his methods of work are atrocious. Yet this same manager has molded men into an organization which gets results under him. The cluttered desk merely indicates that the spirit behind the method is greater than the method. Extra force simply is needed to overcome such a lack of order.

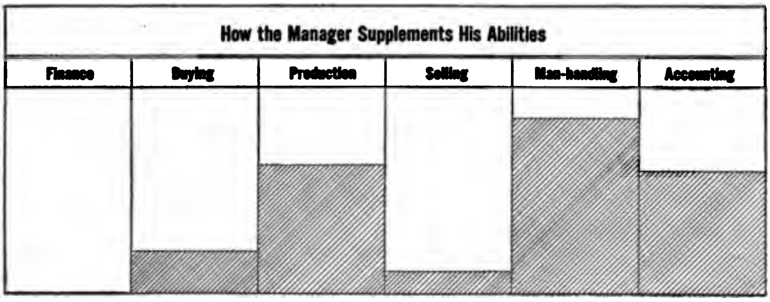


FIGURE IV: Managers are successful, it has been said, in proportion as they have been able to surround themselves with men who supplement their own powers. In this sketch, the unshaded area indicates special abilities the manager possesses, as in finance, selling, and buying. By employing other men (shaded portions) gifted with abilities that round out his weak points, as man handling, production and accounting, the manager mans the concern for success

SUBDIVISION OF WORK THE UNDERLYING PRINCIPLE IN ORGANIZING —THREE MAIN TYPES OF ORGANIZATION

ONCE a manager has determined on his own place in the scheme of things, he will begin to look over the history of management and see what principles other men have discovered and what methods they have worked out to supply their own deficiencies and realize their plans. The present interest in the scientific approach to the problems of management does not signify that it is only within the last twenty-five years that men have suddenly recognized efficiency principles and methods. "Scientific Management" is an evolution (Figure VI). As machinery has brought about "the transference of skill" from the inventor or designer to the power-driven mechanism, a committee for the American Society of Mechanical Engineers has suggested, so scientific principles of management transfer the skill of the manual operator to the planning room, and through the planning room, redistribute it to the advantage of all the operators. Similarly it may be said that, just as machinery has become gradually perfected, over the last hundred years, so managers gradually have evolved and put on record better methods of working with all the factors in production.

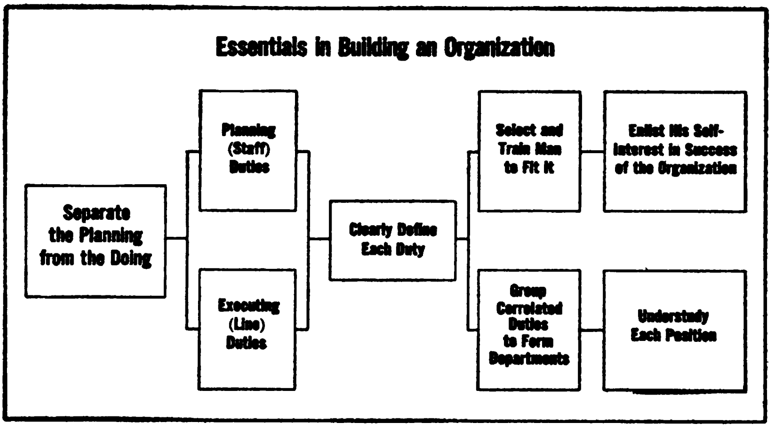

Essentials in Building an Organization
Separate the Planning from the Doing
Planning (Staff) Duties
Executing (Line) Duties
Clearly Define Each Duty
Select and Train Man to Fit It
Enlist His Self-interest in Success of the Organization
Group Correlated Duties to Form Departments
Understudy Each Position

FIGURE V: In building an organization, the first division of routine duties is into planning the work and executing the work. In many enterprises, this primary division is never made, and all efforts at scheduling operations fail because it is not recognized that the shops must be allowed time to plan their work. Further essential steps in organization also are indicated

Here and there an individual manager in an attempt to state his philosophy of management has formulated a plan of procedure that has proved successful in his plant and that brings forward ideas which other men can apply under certain circumstances. Frederick W. Taylor's system of scientific management is the most striking example of this development of standard methods. The precision of his work and his devotion to the carrying out of what he believed were fundamental principles of management gave him a unique position in the field of industrial organization.

To choose a fit type of organization for a particular factory, then, the manager must recognize (1) that the organization is not the end of management, but a means to the end; (2) that he is adapting it to conditions as they are and not as they might be; (3) that he himself is an important condition bearing on the methods he chooses, and (4) that he must expect that his men

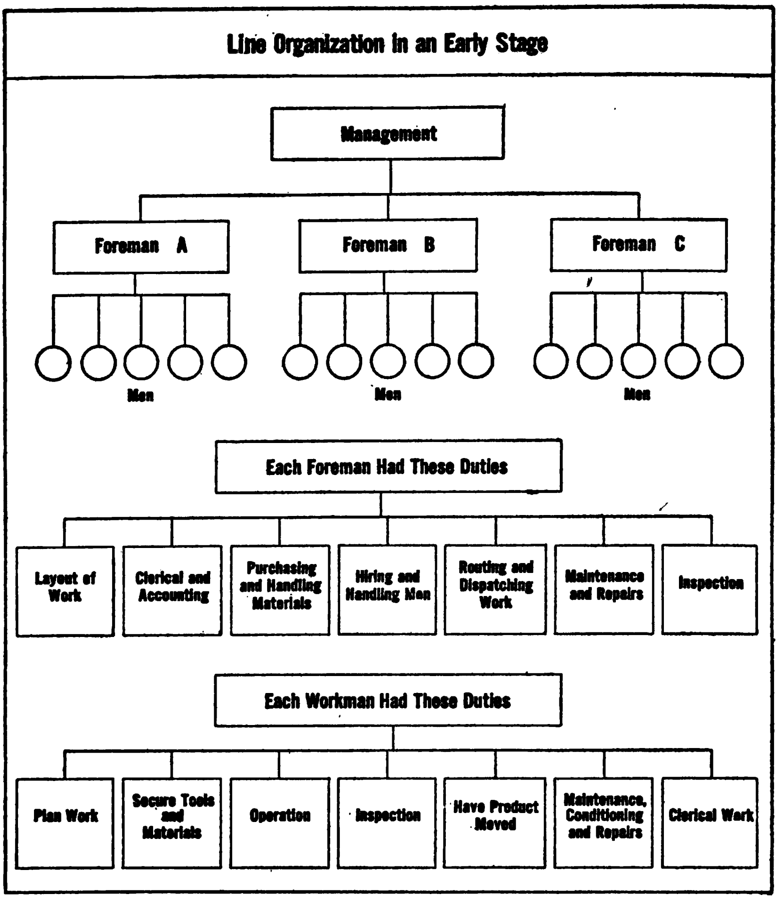

Line Organization in an Early Stage
Management
Foreman A
Foreman B
Foreman C
Men
Men
Men
Each Foreman Had These Duties
Layout of Work
Clerical and Accounting
Purchasing and Handling Materials
Hiring and Handling Men
Routing and Dispatching Work
Maintenance and Repairs
Inspection
Each Workman Had These Duties
Plan Work
Secure Tools and Materials
Operation
Inspection
Have Product Moved
Maintenance, Conditioning and Repairs
Clerical Work

FIGURE VI: Under the early line or military organization, the lines of authority ran directly from the management to the foreman and from him to his men. Each foreman was responsible to the manager for all the work of his department, and each workman looked to the foreman for orders of every sort. Contrast this plan with those indicating the development of staff and functional duties (Figures VII and X)

will grow and develop, and that his plan must fit such development. While principles remain constant, he must expect that conditions vary and both men and methods change.

To suit these requirements of plants in all stages of development, organizations have naturally varied from the simplest to the most complex. Throughout these forms, however, one plain principle prevails—the subdivision of work. Whenever the plant had enough work of one kind to make a job for a man or an executive, some one was appointed to devote himself to that work, to the relief of several other men with whom it had been only a side line. At first this subdivision of work followed no definite scheme; storekeeping, purchasing, costs, power and other special services naturally split off. Gradually, however, the work has become definitely classified, first, into (1) execution and (2) aid toward better methods, with the further subdivision of execution into (a) planning the steps in the work, (b) putting it through and (c) contributing the special services that supply material, power and so on.

If the size of the business warrants, each subdivision of the work is entrusted to a distinct department under a specialist who has a well-defined sphere of responsibility. It is then necessary only to make sure that no important duty shall be left undefined and undone. In the small concern, however, planning and execution are often combined in one man. If he will analyze his work, he will find part of his time devoted to planning, part to operation and part to betterment.

As this division of duties works out, organizations fall into various classes, of which three are distinctive: the line, the line and staff, and the so-called functional scheme. These names, it is true, have their origin in tradition rather than in present conditions. The boundaries between the different types are not clean cut—only the principle of specialized work has become more distinct. But the manager who understands the needs of his business will find that his organization falls naturally under one of these heads or some offshoot from it, and that it will assist him to know how each form works, what its advantages and disadvantages are and what type his conditions demand.

Line organization is the simplest in its conception and the most common. It is the simplest because it is the most natural and goes back to the military alignment of the earliest days when the strongest man was chosen or made himself leader. In that age each head hired, trained, fed and exercised full authority over his company. Similarly, in the elementary forms of line organization, each foreman hires, rates, instructs and releases his men, buys his own supplies, schedules his own share of the work and "thinks out" his own corrections. Loose ends with which several foremen are equally concerned, are thus likely to be neglected, on the basis that "every man's business is no man's business."

Nearly every one-man concern has a line organization, in which responsibility for results is delegated directly from proprietor through manager and foremen down to the operatives. For the most part, the small concern in which no highly specialized division of work can profitably be made, is restricted to the elementary line organization, although the tendency is to split off such operating functions as purchasing, employment, storekeeping, and inspection; also it is every year becoming feasible to engage the part-time services of outside specialists in more and more staff—that is, advisory and improvement—capacities. The line organization also is preferred in certain industries where operation, though simple, is rigidly continuous, and where a military certainty as to who is responsible is the first consideration. Cement-making is an example of this situation.

So the line organization is not essentially a "specialized" organization. Today, however, the greatest immediate gain to a business and to the individuals engaged in it comes when the business and each individual specializes and masters one field. The two other broad types of organization, to which the manager of an unsatisfactory line organization may turn for help, are, therefore, organizations in which improvement as well as operation is specialized.

Line and staff, except by name and degree of specialization, is not particularly new. Whenever any man of authority in a manufacturing establishment gets outside the traditional way of doing the particular task and asks himself three questions, he has a conception of management which will soon bring him a "staff." These questions are:

(1) "Why are we doing the job this way?"

(2) "Is there a better way to do it?"

(3) "How can we work out this better and more economical way?"

If a manager asks these questions and wants action in getting at the correct answers, his next step is to pick out some particular activity or operation in the business and set a man at work answering his question. The "specialist" working outside the routine of the line organization is the first member of his "staff." Obviously the business must have reached a position where the work is complex and the volume large, before many full-time specialists can be maintained economically on staff or critical service. The part-time employment of the outside specialist may, however, be undertaken even by the small concern.

Betterment—organized study, investigation and counsel, designed to establish some improvement in the operation of the plant—therefore, is the feature which distinguishes the line and staff from the line, in which improvement is unorganized. The staff man, having none of the responsibility for getting out the product, can view the problem of future output from a fresh standpoint. A line and staff organization, as it will develop from this simple beginning, is a line organization plus a group of staff experts chosen with regard to their capabilities of finding and standardizing better ways to do certain important functions of the business. In either type of organization, a thorough subdivision of operating functions may exist. The staff feature simply organizes *betterment,* in connection with one or more important functions.

What these functions are, at the start at least, depends on the business. In the paint business the economizing and handling of materials is relatively of more importance than the economizing of labor. In the machine-tool business, where labor enters so largely into the cost and value of the finished products, the investment in skilled labor warrants maintaining "staff" experts to devise methods of making that labor go farther. The chemist, a specialist or staff man, is a necessity in a modern paint factory. Specialization of duties in a large machine industry may also call for a chemist; but in the industry as a whole, the study of the time it takes to machine a piece of tool steel is of relatively greater importance to the manager than the composition of the steel which is delivered to him on specification. Standards of

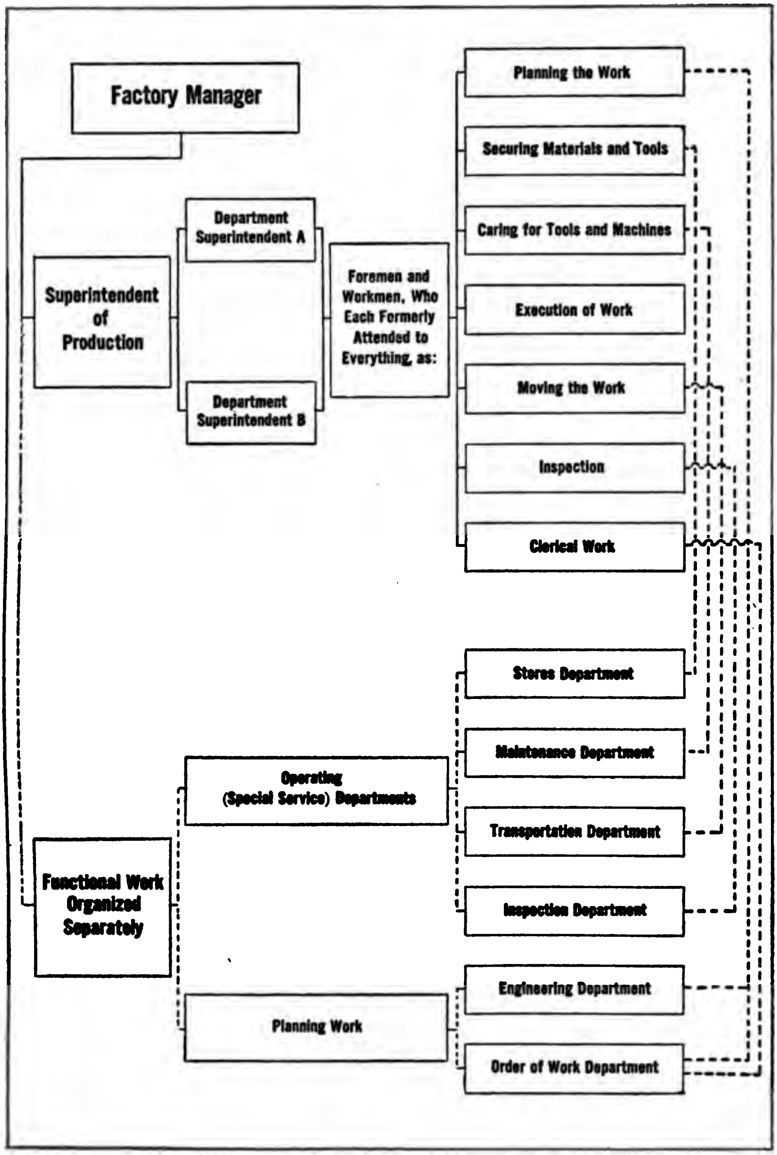

Factory Manager
Superintendent of Production
Department Superintendent A
Department Superintendent B
Foremen and Workmen, Who Each Formerly Attended to Everything, as:
Planning the Work
Securing Materials and Tools
Caring for Tools and Machines
Execution of Work
Moving the Work
Inspection
Clerical Work
Functional Work Organized Separately
Operating (Special Service) Departments
Planning Work
Stores Department
Maintenance Department
Transportation Department
Inspection Department
Engineering Department
Order of Work Department

FIGURE VII: Various functions which were originally a part of every workman's job have gradually been entrusted to specialists, such as purchasing agent, inspectors, and engineers. The development of the functional side of an organization out of the line or military type is indicated by the dotted lines

time, therefore, are even more urgently a subject for "staff" study in such an industry.

In other words, certain "natural" staff or advisory functions exist in nearly every business, and the definite line and staff organization is simply a bringing together and aligning of such efforts at improvement in accordance with the dictates of common sense and profit. Such a development is most often connected with the name of its philosopher, Harrington Emerson, whose principle of "competent counsel" is typified by the staff.

HARRINGTON EMERSON'S TWELVE PRINCIPLES OF EFFICIENCY

1. Ideals
2. Commonsense and Judgment
3. Competent Counsel
4. Discipline
5. Fair Deal
6. Reliable, Immediate and Accurate Records
7. Planning and Dispatching
8. Standards and Schedules
9. Standardized Conditions
10. Standardized Operations
11. Written Standard Practice Instruction
12. Efficiency Rewards

FIGURE VIII: The twelve famous principles of efficiency upon which Harrington Emerson has based his scientific management work are here listed. Such principles as Ideals towards which the business can work, definite Planning and Dispatch of all work in order, Standard Practice and Rewards based upon individual efficiency are fundamental in any business

DUTIES OF STAFF SPECIALISTS—HOW TO SECURE COOPERATION BETWEEN THE LINE AND THE STAFF

SO the line and staff plan, like the pure line organization, still inclines to the old military ideal of one all-around boss for the regular workman in all cases. The manager who would reorganize on line and staff principles leaves the line organization practically as it is, relying upon it to execute his orders. Supplementary to the line organization, however, he develops a staff of specialists, each of whom shall work to raise the standards in some operation, as machine maintenance, inspection, transportation. The work of experts on the handling of materials, for example, or the laboratory testing of raw materials, forms the basis for final action on the part of the line managers and department heads. A staff man works out standards, which are turned over to the head of the business. He in turn, as both the deciding mind and the executive power, has the favored recommendations carried out by the line organization.

It can readily be seen that the line and staff organization will fit a variety of conditions. It may be applied in whole or in part. The one-man shop can consult a whole staff of outside experts. The small business man can employ a single specialist; the large plant, many hundreds. A specialist may assist the line workers in one or many respects. Staff men may be installed during a reorganization and diverted after they have completed their study and plans.

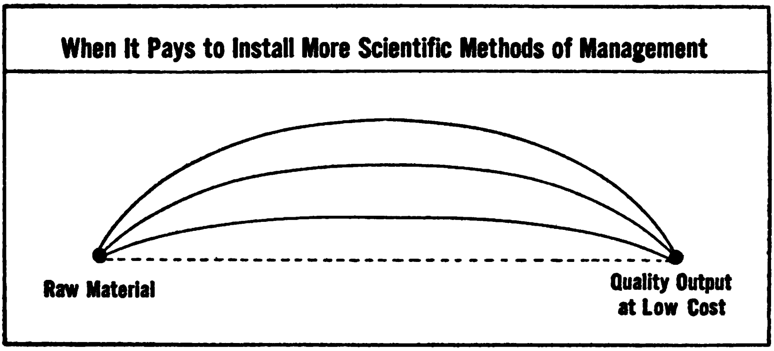

When It Pays to Install More Scientific Methods of Management
Raw Material
Quality Output at Low Cost

FIGURE IX: Betterment specialists sometimes urge the manager to do away with all roundabout methods and make production, storekeeping and cost keeping follow an absolutely direct routine But the manager knows that every method, as indicated, tends to become a curve and that the constant pressure required to flatten the roundabout into the ideal method sometimes costs more than to compromise on a reasonably direct routine. Not the scientific way, but the line of most consistent net profit is the true course

While similar elements are of course present in any system of management, the spirit of the factory has an unusually direct bearing on the success or failure of the line and staff plan. Co-operation between staff and line is essential. The staff needs to have the firm support of the management; and its chief, as head of improvement, needs to be in close understanding with the superintendent of production. Staff functions often are not correlated. They lap over, or failing to meet, leave gaps in the program of improvement. Criticism or suggestion, moreover, frequently tends to become impractical; and for the staff not to enjoy the support of the line is likely to block the reform. Hence the importance of a firmly seated chief of staff, directing all betterment and arbitrating between the doer and the advisor.

The staff men, moreover, require unusual resourcefulness and tact. Under such conditions only can the specialized staff get at the facts with which to work and the line take full advantage of standards which the staff may have developed.

FUNCTIONAL MANAGEMENT SEEKS TO STANDARDIZE THE ONE BEST WAY —TAYLOR'S CONCEPTION OF CONTROL

LINE and staff grew naturally out of the limitations of the line organization. The fact is that it rarely proved feasible to secure a man for a line position who also had the qualities, ability and opportunity to detach himself from his work and study out better methods. At best he is likely to give undue weight to the difficulties in the way of their adoption; and to this rule, the manager himself is no exception. The third main type, which has been called functional, is also a development of the more scientific approach to business and in its extreme form attempts to put operation on a scientific basis throughout the plant.

As stated, the relation of line and staff to line organization suggests itself when the manager asks three questions:

(1) "Why are we doing the job this way?"

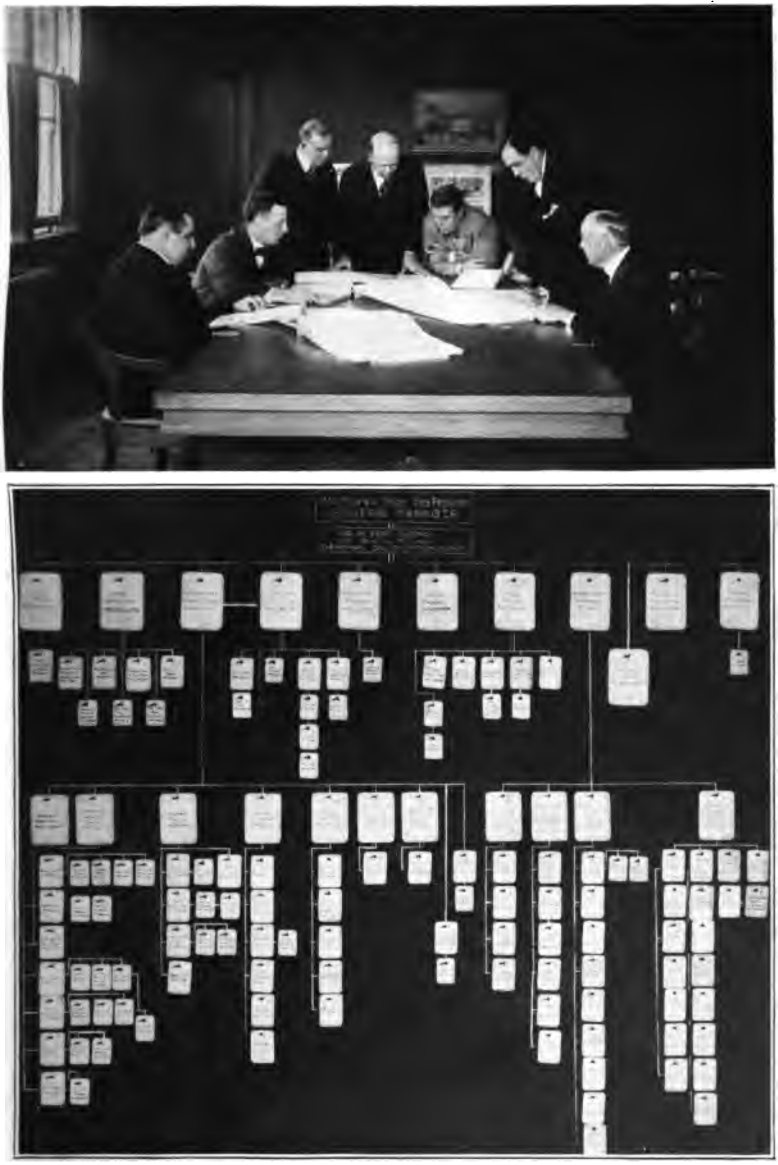
(2) "Is there a better way to do it?"

(3) "How can we work out this better and more economical way?"

The better way for which the staff is to search may still be "rule-of-thumb," or highly scientific in one or many departments.

To apply the functional system of management as conceived by Frederick W. Taylor and his group of associates, the average manager must answer in the affirmative one more question. "Can I determine the 'one best way' of doing each piece of work in my factory and make that way absolutely standard under my working conditions?" Taylor not only believed this possible, but approaching the problems of production as a scientist with an eye to results, demonstrated that it could be done.

So distinct is Taylor's conception of the unity of a specialized system of organization that a later chapter describes in detail how the Taylor system works. For purposes of comparison it may be said that Taylor's system, while adopting the common



Committee consideration of a management problem is shown above—a meeting of department heads in the office of President H. L. McClaren of the Mitchell-Lewis Motor Company. Below appears the unique chart board used at the Pierce-Arrow Motor Car Company to indicate the division of responsibility in that organization

Different types of factory "conning towers" are here shown. Below, the general foreman of the Gas and Electric Company of Baltimore, is surrounded by recording instruments. Above is E. St. Elmo Lewis, vice-president, Art Metal Construction Company In the middle, Chief Engineer Doane of the National Lamp Works is at his unique desk, which is cut out in front for convenience practice of tentative standards to begin with, is in its final proposals rigidly scientific. It not merely suggests a straightening of the most serious kinks in production, but hews to a straight line in all operations (Figure IX).

True Taylor principles and methods cannot be applied piecemeal, and their success depends upon the whole institution from president down to operative being "sold," or won over to the idea that their aims are commercially possible and practical, and fundamentally just.

Any organization—the line and staff or even the line—may have its functions logically grouped. Recent line and staff organizations are effectively subdivided for planning, execution and betterment. But the functional system of management which is usually associated with Taylor's name, is further distinguished by three points:

(1) As originally worked out in complex industries it carries specialization of duties somewhat further than the other forms.

(2) The main division of work is divided into planning and execution; and the staff function of betterment is a definite part of the planning function.

(3) The individual workman does not look to one foreman for all orders, as under the line or line and staff, but receives instructions directly on different aspects of the operation from several so-called "functional bosses."

All activities within an establishment are split into the two groups: planning work and executing work. The planning end of management in all its details, critical as well as constructive, is taken over by a planning department. The executive end of management, the follow-up and disciplinary functions, is given in charge of a group of functional foremen, who serve as inspector, repair boss, speed boss and gang boss (Figure X). Supervision is thus specialized no less than operation. The head of the factory works out his policies through these two groups of men. He or his head foreman, in the most successful functional systems, constitutes "line" control over the functional foreman. A well-planned organization of this sort also will probably free the chief from detail and enable him to act with perspective as head of improvement in the prime points of organization and policy.

It is not an accident that functional organization was first developed in the machine-tool industry. In a simple, elementary industry, the traditional way may be as near to the scientific method as the manager can profitably hew. The ideal method often threatens to cost more than it saves, and a modified functional scheme is accordingly adopted. Taylor himself states that he was forced to subdivide supervision, because foremen capable of both planning and executing in intricate production work could not be found in sufficient numbers, and when found were too valuable to be left in foremanships. So it is in complex pro-

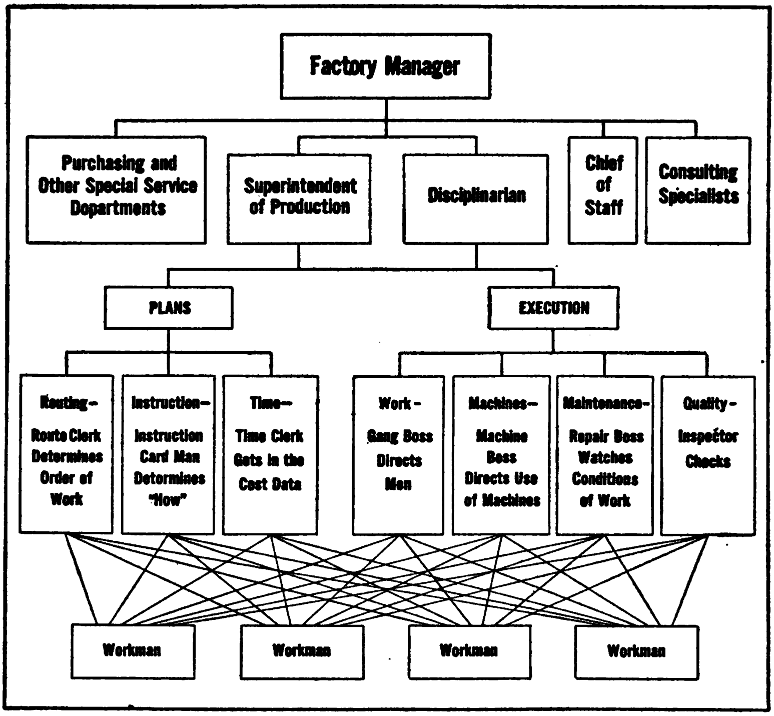

Factory Manager
Purchasing and Other Special Service Departments
Superintendent of Production
Disciplinarian
Chief of Staff
Consulting Specialists
PLANS
EXECUTION
Routing— Route Clerk Determines Order of Work
Instruction— Instruction Card Man Determines "How"
Time— Time Clerk Gets in the Cost Data
Work- Gang Boss Directs Men
Machines— Machine Boss Directs Use of Machines
Maintenance- Repair Boss Watches Conditions of Work
Quality- Inspector Checks
Workman
Workman
Workman
Workman

FIGURE X: In a functional organization, it is frequently said, every workman has several bosses. These bosses, however, are primarily helpers, who relieve the operator of practically every planning and operating function except turning out the product. A staff of betterment specialists is frequently maintained to devise new standard methods. Bosses and workmen alike are directly responsible to the disciplinarian for adherence to instructions

cessing, where the planning work warrants the use of many staff specialists and particularly a highly developed order department, that the Taylor plan promises most.

Looking at functional management as a prospective system of organizing his establishment, the first point that strikes the average manager is that of separating even the routine of planning from execution. Unless he has some conception of the number of men in an ordinary line organization who are combining both functions, he will be startled at the force of planners he must segregate in this department when he applies the Taylor scheme. This first view of the planning department, unless he realizes how many "part-thinking" and "part-working" jobs there are in his establishment, will bring out the remark, "What a tremendous overhead!" One manager was startled to discover thirty-five per cent of the productive shop force enrolled in the planning department. Not until he analyzed the situation did he see the reasonableness of what at first looked like "more clerks than workmen." As a matter of fact, the planning was a large part of production.

So the average manager who would apply the Taylor system of scientific management must completely revise his thinking about the relative proportions of what unfortunately have been termed "productive" and "non-productive" labor. It is traditional that a main function of management is to hold down the proportion of "non-productive" to "productive" labor. Before a manager applies the basic Taylor principle of separating planning from doing, he will have to rid himself of this old idea and think in new terms of the so-called "non-productive" and "productive" classes of work, which as terms ought long ago to have been discarded.

ENTRUSTING ADVISORY DUTIES TO COMMITTEES—THE ROTATING COMMITTEE AND THE UNIT SYSTEM

VARIATIONS of the three basic ways to organize are of course found in many factories. The committee form of management may be said to be a variant of the line and staff, in which committees made up of line department heads at stated intervals devote time to special studies and offer definite reports on broad policies affecting the organization as a whole. Such committees are sometimes temporary, and sometimes permanent. They may recommend the establishment of a staff, or the employment of an expert on some problem. They are successful in so far as their chairmen are leaders. They belong in the class of factory organization which may be termed "systematized" rather than "scientific," and have advanced industrial practice far beyond unsystematized control.

Often the committee system is a step toward a more definite line and staff or functional type of organization. The principles of this system were perhaps most thoroughly applied in the development of the National Cash Register Company's organization. John H. Patterson, the president of the company, devised the well known "pyramid form" of organization chart. Mr. Patterson conceives that heads of departments and executives should depend on those below and that the pyramid from base to top best indicates where the strength of an organization lies.

Cooperative effort among department heads and among departments is developed by the committee system. No group of department heads can attend planned meetings regularly and not discover that every one has troubles of his own. Under the right leadership, the committee plan brings to a fair decision differences of opinion which forecast serious friction.

Under the committee system as generally organized, the committees are advisory in character. The factory manager heads the general factory committee. Individual members consist of the engineer or the head of the designing department, the head of the tool making department, the foremen of the different processing departments and the head of the cost department. A stenographer acts as secretary.

Such a committee may discuss and appoint acting sub-committees on such problems as how routine can be developed to push work through, how to reduce costs and how to redesign or standardize the product. In one plant a Monday morning foremen's meeting toned up the whole routine of getting work done. Not only have the meetings developed team spirit, but out of the suggestions for taking up lost motion between departments, a unique follow-up board was devised. A sub-committee put the results of the Monday morning meetings before all the heads of departments and provided the necessary incentive for carrying out the decisions of the meeting.

Intense specialization sometimes develops lop-sided executives in both line and staff places—men who worship tradition and action, to the exclusion of experiment and research, or the converse. Against this danger, the study of betterment problems by line men fulfilling staff duty on committees offers relief. Especially if the membership of the committee changes by rotation will mutual understanding and a company viewpoint be fostered in all.

Another type of organization which cannot be classified directly under line, line and staff or functional is that developed by Major Hine. This is known as the Unit System. It is in a way a combination of the line and staff principles and the rotating committee principle of management. Mr. Hine develops the army and navy idea of amalgamating staff and line functions. He believes that "by substituting periodic details from the line for permanent appointments to the staff, an ideal organization can be developed."

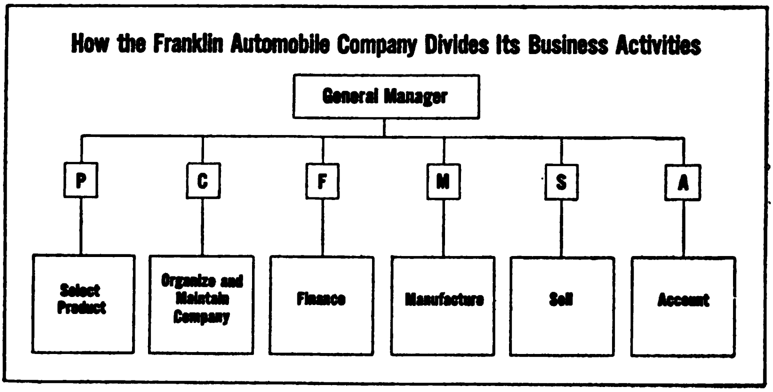
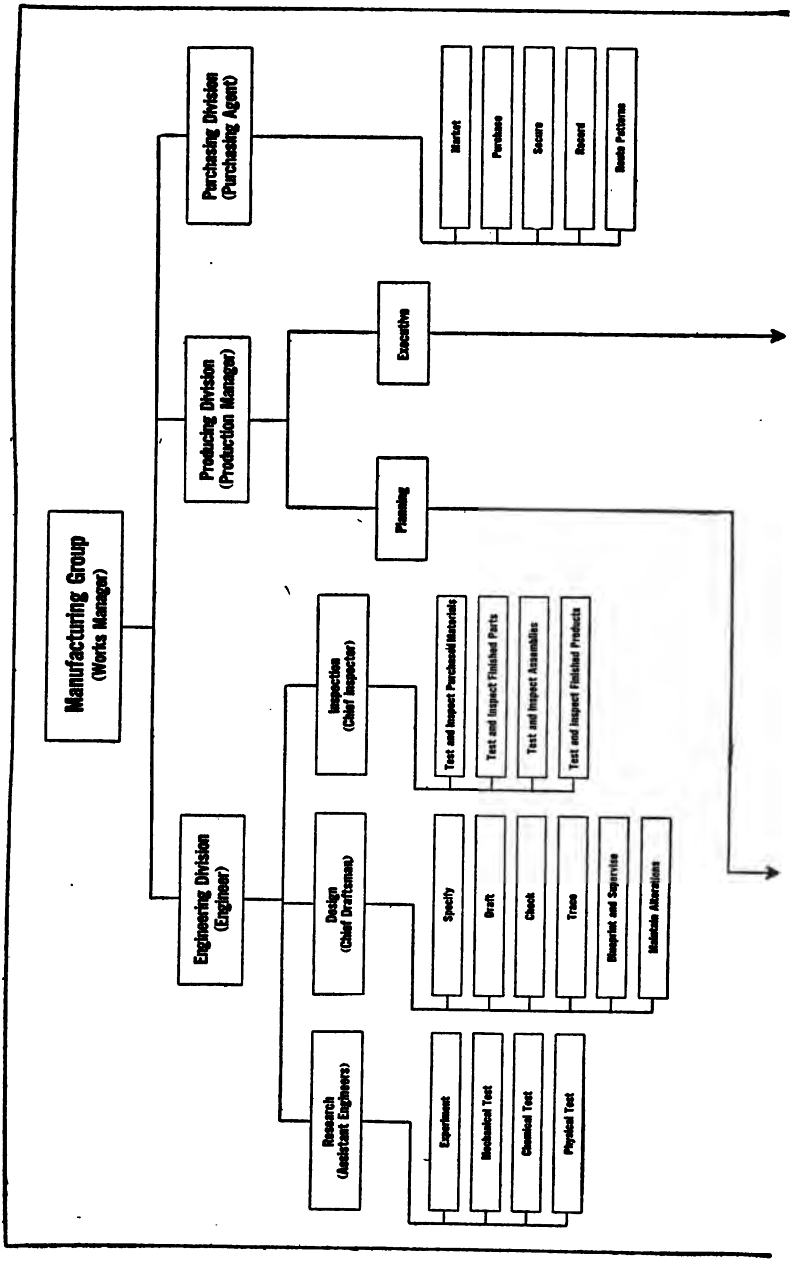

How the Franklin Automobile Company Divides Its Business Activities
General Manager
P
C
F
M
S
A
Select Product
Organize and Maintain Company
Finance
Manufacture
Sell
Account

FIGURE XI: The six main responsibilities connected with a thoroughly organized automobile manufacturing business are here shown, with the mnemonic symbols used to represent them in the company records. The production organization is further charted in detail (Figure XII)

His plan has been applied in what are known as the Harriman lines—the Union Pacific and Southern Pacific Railway Systems. The plan separates the work an executive does from the definite title for that work. For example, instead of the titles "general


Manufacturing Group
(Works Manager)
Purchasing Division
(Purchasing Agent)
Market
Purchase
Secure
Record
Route Patterns
Producing Division
(Production Manager)
Executive
Planning
Engineering Division
(Engineer)
Inspection
(Chief Inspector)
Test and Inspect Purchased Materials
Test and Inspect Finished Parts
Test and Inspect Assemblies
Test and Inspect Finished Products
Design
(Chief Draftsman)
Specify
Draft
Check
Trace
Blueprint and Supervise
Maintain Alterations
Research
(Assistant Engineers)
Experiment
Mechanical Test
Chemical Test
Physical Test

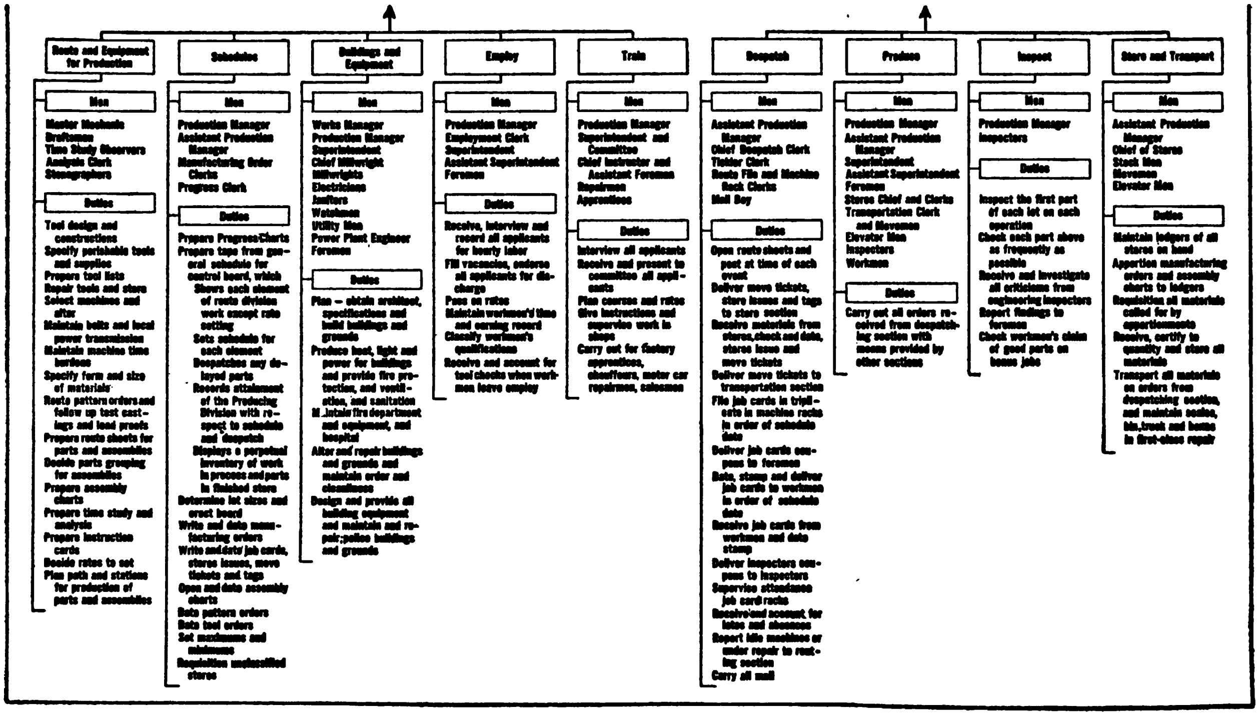

Route and Equipment for Production
Men
Master Mechanic
Draftsmen
Time Study Observers
Analysis Clerk
Stenographers
Duties
Tool design and constructions
Specify perishable tools and supplies
Prepare tool lists
Repair tools and store
Select machines and alter
Maintain belts and local power transmission
Maintain machine time burdens
Specify form and size of materials
Route pattern orders and follow up test castings and lead proofs
Prepare route sheets for parts and assemblies
Decide parts grouping for assemblies
Prepare assembly charts
Prepare time study and analysis
Prepare instruction cards
Decide rates to set
Plan path and stations for production of parts and assemblies
Schedules
Men
Production Manager
Assistant Production Manager
Manufacturing Order Clerks
Progress Clerk
Duties
Prepare Progress Charts
Prepare tape from general schedule for control board, which
Shows each element of route division work except rate setting
Sets schedule for each element
Despatches any delayed parts
Records attainment of the Producing Division with respect to schedule and despatch
Displays a perpetual inventory of work in process and parts in finished store
Determine lot sizes and erect board
Write and date manufacturing orders
Write and date job cards, stores issues, move tickets and tags
Open and date assembly charts
Date pattern orders
Date tool orders
Set maximums and minimums
Requisition unclassified stores
Buildings and Equipment
Men
Works Manager
Production Manager
Superintendent
Chief Millwright
Millwrights
Electricians
Janitors
Watchmen
Utility Men
Power Plant Engineer
Foremen
Duties
Plan – obtain architect, specifications and build buildings and grounds
Produce heat, light and power for buildings and provide fire protection, and ventilation, and sanitation
Maintain fire department and equipment, and hospital
Alter and repair buildings and grounds and maintain order and cleanliness
Design and provide all building equipment and maintain and repair; police buildings and grounds
Employ
Men
Production Manager
Employment Clerk
Superintendent
Assistant Superintendent
Foremen
Duties
Receive, interview and record all applicants for hourly labor
Fill vacancies, endorse all applicants for discharge
Pass on rates
Maintain workmen's time and earning record
Classify workmen's qualifications
Receive and account for tool checks when workmen leave employ
Train
Men
Production Manager
Superintendent and Committee
Chief Instructor and Assistant Foremen
Repairmen
Apprentices
Duties
Interview all applicants
Receive and present to committee all applicants
Plan courses and rates
Give instructions and supervise work in shops
Carry out for factory apprentices, chauffeurs, motor car repairmen, salesmen
Despatch
Men
Assistant Production Manager
Chief Despatch Clerk
Tickler Clerk
Route File and Machine Rack Clerks
Mail Boy
Duties
Open route sheets and post at time of each event
Deliver move tickets, store issues and tags to store section
Receive materials from stores, check and date, stores issue and move tickets
Deliver move tickets to transportation section
File job cards in triplicate in machine racks in order of schedule date
Deliver job cards coupons to foremen
Date, stamp and deliver job cards to workmen in order of schedule date
Receive job cards from workmen and date stamp
Deliver inspectors coupons to inspectors
Supervise attendance job card racks
Receive and account for lates and absences
Report idle machines or under repair to routing section
Carry all mail
Produce
Men
Production Manager
Assistant Production Manager
Superintendent
Assistant Superintendent
Foremen
Stores Chief and Clerks
Transportation Clerk and Movemen
Elevator Men
Inspectors
Workmen
Duties
Carry out all orders received from despatching section with means provided by other sections
Inspect
Men
Production Manager
Inspectors
Duties
Inspect the first part of each lot on each operation
Check each part above as frequently as possible
Receive and investigate all criticisms from engineering inspectors
Report findings to foremen
Check workmen's claim of good parts on bonus jobs
Store and Transport
Men
Assistant Production Manager
Chief of Stores
Stock Men
Movemen
Elevator Men
Duties
Maintain ledgers of all stores on hand
Apportion manufacturing orders and assembly charts to ledgers
Requisition all materials called for by apportionments
Receive, certify to quantity and store all materials
Transport all materials on orders from despatching section, and maintain scales, bin, truck and bettes in first-class repair

FIGURE XII: To perfect an organization, the management needs to know just what regu lar and intermittent duties are to be done, what men are needed to handle them, and how these duties may best be subdivided and assigned. How these fundamental points of organization work are handled in the manufacturing division of the Franklin automobile organization is here shown by a chart based upon a discussion by George D. Babcock, production manager,

superintendent," "superintendent of motive power" and "chief engineer," each such man under the general manager is given the title "assistant general manager." Each of these men in railway work knows something of the duties and authority of the others, and upon the elimination of artificial barriers between executives set up by titles, the whole group of assistant managers has been found to work as a unit in the discharge of its particular function on the road. The assistants in the general superintendent's office exercise their functions in the same way.

One of the immediate advantages of the plan in railroading is that of substituting the real authority of the assistant manager in charge of the office at that time, for the petty authority of the clerk who formerly represented the assistant in his specialized function when he was absent and signed his superior's name to something for which he as a clerk was not responsible.

If there is any one leading lesson in the Unit System for the average manager of an industrial establishment, it is insistence on the psychological value in every man signing his name for what he is individually responsible and nothing more.

Here and there throughout the country have developed other variations of the three general systems. Any system of developing suggestions from workmen may be regarded as giving every one in the business a staff or planning function. The "legislative" scheme is also in successful operation. In this, much the same organization appears as in the state and national governments. The factory is planned as a democracy. The executives form a cabinet about the chief executive. The department heads are organized as a senate, and a group of men, one elected by perhaps every twenty employees, as a house of representatives. A constitution is drawn up and signed by all, and in all meetings, rules of order and the majority vote prevail. Inspiring leadership and a fair division of dividends—responsibility and incentive—incline the entire body of employees to think as well as work for the business.

It may be said of many organization plans that they class as "hobbies" of the men who are responsible for their success, but do not contain new principles. They emphasize again the variable human factor in management, and illustrate how a business grows around and supplements the personal qualities of its head.

No matter what the form of organization, the main point in deciding on one for a works is to make it fit conditions. Probably there will be little option—conditions may dictate one or another form beyond question. There are ideals and principles which the manager may adopt as his. The method of applying them must depend upon the business, the manager and the employees.

In the average enterprise the first organizing or corrective step in this application of principles which the manager can take is to classify the work ahead into broad groups and then choose the men, determine the type of organization most fitting for himself, his men and his enterprise, and lay out the duties of these groups of department heads and employees on paper. George D. Babcock, Production Manager, Franklin Automobile Company, in a paper before the Efficiency Society, has summarized such a general plan.

All the business of the company under the general manager is split into six groups of activities: (P) Selecting the Product, (C) Organizing and Maintaining the Company, (F) Financing, (M) Manufacturing, (S) Selling, (A) Accounting (Figure XI).

The manufacturing group, designated as "M," splits into three divisions, all of which are under the jurisdiction of the works manager. These divisions are engineering, producing and purchasing. As Mr. Babcock explains, the form or method of this manufacturing organization is not necessarily "liftable," or applicable without change to another business. It indicates, however, what activities the organization must be shaped to carry on and how these activities are logically grouped.

The second step is to take each subdivision of the three main groups and outline its duties and responsibilities. With the Production Division as an example, this analysis of duties is shown in Figure XII. Again it should be recalled that these lists of duties and responsibilities are definitely adapted (as they should be) to the turning out of automobiles at the Franklin Company's factory. But the general plan of mapping out production duties and actually applying the organization principles holds true for any business, and whether or not put on paper, is a fundamental step in organizing a plant or bettering present conditions.

III

THE SELECTION AND TRAINING OF EXECUTIVES

"WHAT makes a 100% man" read the heading on a sheet sent to the department heads in a business. Listed on the left side of the sheet were ten qualifications for individual efficiency. Each person was asked to vote privately and to list these qualifications in the order of their importance, as he saw it, for executives, clerks and three classes of labor. The vote is tabulated in the accompanying chart (Figure XIII).

Votes of nine individuals are reproduced. Not least interesting is the reflection their ballots give of the characteristics of the voters. Compare D's vote with C's. D is an advertising manager, C a credit manager. Compare H, the vote of the president of the company, with A, that of the general manager. One man, trained as a psychologist, made a special answer. The only woman voting, G, acted in the capacity of advisor for the women of the company. Her vote agreed most closely with that of the president.

The tabulations explain themselves so far as individual conceptions of ability go. But, more important, they suggest the great difficulty of laying down rules for the selection and training of the individuals in a factory. Even after the organization has been planned on paper, the problem of finding and developing men for the executive places is one of the most difficult in business today. The training of workmen is now an accepted routine in many plants, but little has been said about the training of executives. "Where can I find right-hand men?" and "How can I develop them?" are questions hundreds of managers are asking. A factory superintendent in a New England town said:

"There's just one man in the shop of two hundred that I can rely on to take the initiative and find the 'bugs' in something that's gone wrong. And he's getting too old."

This superintendent's problem is not different from that of other heads of manufacturing establishments. Specialization in organization has created a demand for specialized men that cannot altogether be supplied. Yet this problem has been met, and can be met in any business. Specialized work, specialized planning, specialized supervision, are, as Frederick W. Taylor has explained, an effort at the solution of the even more difficult problem of securing help; partly-rounded executives are assigned parts of the job which one full-rounded foreman or supervisor could handle alone.

So the first step to take, as one of the men said in voting on the question, "What makes a 100% man?" is to list the functions a position involves and then classify the qualities required. The next step is to locate and determine upon men who fit or can be trained to fit these different positions

HOW A BUSINESS MAY DEVELOP ITS OWN EXECUTIVES UNDER AN INTELLIGENT SYSTEM OF PROMOTION

ANY business is a school. Some are better schools than others, but all have in them practically every essential element needed to train for executive positions. The prime source of department heads and executives in a going plant, therefore, is the organization itself. It is more than pleasant theory that men should be developed within an organization and not taken from the outside. So doing gives the selection a basis of experience on which to proceed, and capitalizes the training the man has already been given. Every so often there is a necessary exception to the rule, but most executives agree that the natural and fair way is to develop the civil service idea as far as possible within a business. Where exceptions must be made, care is required to choose a man who fits the business; otherwise neither the newcomer nor the organization can profit by the relation.

Curiously enough, comparatively few matured methods of training executives for advancement are found either within or without a business. Directors of men have, in general, shown that they were in that class by pushing their heads above the level, in spite of conditions. After all, this is a sound test of ability and perhaps the most practical and fairest way of know-

How Eight Executives Select Men

	Qualities	Executive A	Executive B	Executive C	Executive D	Executive E	Executive F	Executive G	Executive H
Executive	Good Health	10%	4	10	1	4	5	5	5
	Character	10%	1	9	10	5	10	1	1
	Disposition	5%	6	8	9	9	9	8	6
	Originality	10%	7	5	8	7	8	2	4
	Determination	15%	3	6	5	2	4	7	3
	Good Observation	10%	9	4	3	8	2	4	7
	Retentiveness of Mind	5%	10	7	4	6	3	6	8
	Initiative	15%	5	2	2	1	1	3	2
	Training	5%	8	3	7	10	7	10	9
	Experience	15%	2	1	6	3	6	9	10
	Total	100%							
Clerical Man	Good Health	25%	2	20%	1	4	5	2	
	Character	10%	1	15%	5	5	4	1	
	Disposition	10%	6	10%	8	8	6	3	
	Originality	5%	4		9	10	9	10	
	Determination	5%	5		7	7	7	7	
	Good Observation	10%	8		2	6	1	8	
	Retentiveness of Mind	5%	10		3	9	2	6	
	Initiative	10%	3	5%	10	3	10	9	
	Training	10%	7	15%	6	2	8	5	
	Experience	10%	9	35%	4	1	3	4	
	Total	100%		100%					
Skilled Labor	Good Health	25%	4	50%	1		3	6	
	Character	10%	1		8		8	9	
	Disposition	5%			9		9	7	
	Originality	10%			10		10	8	
	Determination	5%	5		6		6	10	
	Good Observation	5%			4		4	3	
	Retentiveness of Mind	5%			5		5	4	
	Initiative	10%	3		7		7	5	
	Training	5%			3		2	2	
	Experience	20%	2	50%	2		1	1	
	Total	100%		100%					
Semi-skilled Labor.	Good Health	30%	4	75%	1		2	1	
	Character	10%	1		6		6	5	
	Disposition	5%			7		7	4	
	Originality	5%			10		10	10	
	Determination	5%	3		4		4	8	
	Good Observation	5%			3		3	6	
	Retentiveness of Mind	5%			5		5	9	
	Initiative	10%	5		9		9	7	
	Training	5%			8		8	2	
	Experience	20%	2	25%	2		1	3	
	Total	100%		100%					
Unskilled Labor	Good Health	50%	5	100%	1		1	1	
	Character	10%	1		5		5	5	
	Disposition	5%			8		8	2	
	Originality				10		10	10	
	Determination		2		3		3	9	
	Good Observation				4		4	8	
	Retentiveness of Mind	10%			7		7	7	
	Initiative	5%	3		9		9	6	
	Training	5%			6		6	3	
	Experience	15%	4		2		2	4	
	Total	100%		100%					

FIGURE XIII: How eight executives rank ten personal qualities in importance for an executive, a clerical man, and three grades of labor, is here shown. In voting, some used a percentage to indicate the importance of each quality, others a number. Executive D, for example, ranks "good health" as the first essential in an executive, and "character" as tenth. H ranks "character" first, and "good health" fifth. The vote proves how widely managers differ in their conception of ability

ing which men to choose for the heads of departments and the general executive branches of a business.

WISE SELECTION MAKES THE QUALITIES OF ONE EXECUTIVE ROUND OUT DEFICIENCIES IN OTHERS

WHEN it comes to listing qualifications for different jobs, there is a wide difference of opinion. In the end, the manager will have to lay out a scheme of selection that takes into consideration these varying viewpoints, but which after all must be more or less arbitrary if it is to come within reasonable limits of expense. In any group of managers, ask the simple question, "What is an executive?" and you will immediately get a diversity of opinion. The point is that all qualities are relative and any arbitrary list immediately suggests exceptions (Figure XIV).

WHAT QUALITIES THREE AUTHORITIES REQUIRE IN AN EXECUTIVE

DR. KATHERINE BLACKFORD	WILLIAM KENT	FREDERICK W. TAYLOR
Keen sense of justice	Education and special knowledge	Brains
Courtesy	Industry	Honesty
Dependableness (constancy, reliability, uniform disposition)	Aggressiveness	Education
Courage	Health	Judgment or common-sense
Love	Energy	Tact
Teachableness (ability to learn even from the lowest worker; openness of mind)	Initiative	Special or technical knowledge; manual dexterity or strength
Tactfulness	Tact	Energy
Sympathy (ability to appreciate the other man's position)	Personality	Grit
Understanding of human nature	A degree of laziness	Good health

FIGURE XIV: How authorities differ in their estimate of the qualities essential to success as an executive is well illustrated by this tabulation of the points on which Blackford, Kent and Taylor would base judgment

Differences of opinion as to what constitute executive characteristics of course are less marked as the matter narrows to more specialized positions. A factory manager in Michigan who wished to overhaul his shop methods and devise better ones chose out of his own force a young mechanic brimful of ideas and enthusiasm, and hired an associate editor of a technical paper to give the pair "generalizing" ability. Those two men, one knowing the general approach, the other the shop policies, tactics and methods, completely rejuvenated the methods in that plant. When one specialist lacks complete balance, to match another with him is a useful device.

For many classes of factory work the trained engineer is proving his special fitness for executive positions. Assistant superintendents, designers, plan room heads and special staff men of all classes are chosen successfully from this group of prospects. If in addition to trained minds and special knowledge they have, what many technical men lack, imagination and initiative, they will not stop with the lower executive positions, but may be relied on to grow to fill larger capacities in a manufacturing or selling organization.

In anticipation of the usual difficulty, a Wisconsin maker of sanitary ware, foreseeing the necessity of replacing his superintendent by a younger and more energetic man with a broader and more scientific viewpoint, hired a young engineer graduate who had imagination and a year or two of practical experience along efficiency lines. He kept him at this same sort of work for several years, moving him from operation to operation until the entire round had been covered. Then, one day, as if by no intention, the young engineer was put in charge of a department. He is succeeding splendidly and it is only a question of time before, again as if without design, he will be advanced to the superintendency. Some day, if he continues to develop, he will be called still higher. By this plan of starting well qualified men young, the occasions for departing from the established policy of filling all vacancies from the ranks, even in the case of the highest positions, are reduced to the minimum.

Men in one department or one business of course cannot be all alike in characteristics. A good organization is a mixture of types of men, supplementing one another and their chief. Besides acting as a superintendent of schools, a general manager needs to be a good cook. The greatest and best output comes when the recipe of men is right.

HOW TO PICK FOREMEN AND WHEN TO BRING IN OUTSIDERS ON THEIR MERITS

NEXT to finding men for the high executive offices in a manufacturing establishment comes the problem of finding a supply of foremen. Probably no general branch of management is more neglected. The foreman in the average line organization (and it must be remembered that the line organization is by far the greatest numerically in American industries) is the choice of circumstance. Good foremen are vital to successful manufacturing. In the average plant, the foreman is disciplinarian, time clerk, master mechanic, follow-up man, plan man and general executive for his department. In the newer type of organization where his work is specialized, the choice of foreman becomes simpler. It is easier to take an intelligent workman with some native ability in handling men, and fit him to a special task than to choose and train a man for duties which require nine or ten valuable qualities in a high degree.

How to choose a well-rounded foreman is the essence of building up effective executives. The manager in one small shop has the reputation of picking men from the ranks with great success. His plan is simple: *find the men who know.* Whenever the head of a department is absent he makes a point of asking questions of the men. Sooner or later the man who measures up under this scrutiny wins a foremanship.

Merit, of course, must largely be the basis of advancement in any case. Length of service needs also to be weighed, but only when other things are equal may it safely be given first consideration. Nothing could be more dampening to enthusiasm than to make seniority the chief test. On the other hand, it is almost equally dispiriting to disregard this element.

As between advancement and the employment of an outsider, also, merit must be the chief criterion. However excellent is the policy of filling vacancies from the ranks, inflexible adherence to it will result in a gradual letting down all along the line. Give your own men the first chance, but do not hesitate to introduce new blood in a fair way if the issue has narrowed to one of fitness purely. When your men know that vacancies will be filled in this way, in case none of them is sufficiently developed to qualify, they will be stimulated to increased endeavor. Moreover, it pays to bring in a new man occasionally for the sake of the invigorating reaction of a fresh viewpoint upon the atmosphere of the shop.

Rarely is it necessary to have recourse to an outside supply, except of course for beginners and common or unskilled labor; and as a rule all newcomers, regardless of their previous experience, should start at the lowest level. From these should come the semi-skilled workmen, and from this class the skilled machine operators and tool makers. Normally in turn the skilled class should furnish the foremen and other responsible heads.

LEADERSHIP ABILITY DIFFERENT FROM AND MORE IMPORTANT THAN CRAFTSMANSHIP IN CHOOSING FOREMEN

BUT because a man is an excellent workman, it does not follow always that he will make a satisfactory shop executive. Every advance in position calls into play new qualities, for which the candidate must stand test if he is to succeed. The best mechanics often make the poorest foremen. "We promote a man from the ranks whenever we can," said one manufacturer, "for we prefer a foreman who has intimate, practical knowledge of the work he is to supervise. Unfortunately, however, few workmen possess the qualities essential to success as foremen. Leadership ability we deem more important than ability actually to do the work, for a bright fellow who knows how to handle men will soon enough learn the other part of it. Therefore, we do not hesitate to go outside to get the man we want."

Often, too, a workman elevated from the ranks finds his old associates jealous or unruly. To relieve the new foreman of this handicap one manager gets his foremen from other departments. For instance, he took a high-grade foundryman and made him foreman of the chippers and grinders. For his chief product inspector, he took a foundry clerk; for superintendent

By executive conferences such as these, factory problems are brought to a profitable solution. The committee meetings shown are (below) at the Buck Stove and Range Company, St. Louis; (middle) the foremen's meeting at the plant of the Addressograph Company, Chicago; and (above) a conference about the topographical map at the Janss Investment Company, Los Angeles

A full committee for the consideration of sub-committee reports in the office of Hann & Kendall, at Dallas, appears below. In the middle is the strategically placed office of the foreman at the Hawthorne machine shop of the Western Electric Company. Above is shown a student under the part-work, part-study plan developed and established in Cincinnati

of factory transportation, he took a checker in the shipping room. Occasionally he drafted a foreman from one department for service in another. In this way he avoided both the incubus of familiarity that attaches to a workman elevated to the foremanship in his own department and the dispiriting effect that attends the bringing in of a total outsider. As he exercised rare discretion in picking his men for their leadership qualities and keenness of observation, he almost never scored a failure. An unexpected gain incidentally resulted. Men shifted from an initial to a final department showed greater patience with the shortcomings of preceding departments and were more constructive in their criticism, while those transferred in the reverse direction evinced an uncommonly deep interest in all the details of the work that affected the production of succeeding departments. A higher standard of workmanship thus was promoted throughout the plant.

This same expedient often is equally successful with respect to positions of broader executive responsibility. Every promotion is a chance to round out a lack in the organization. An Iowa manufacturer of agricultural machinery, when his establishment had grown so large that he felt the need of an assistant to himself, called to the post the sales manager of one of his branch offices. He did this in lieu of promoting his superintendent, because he wished to have more of the sales viewpoint impressed upon the shop. The new manager was handicapped, of course, by his lack of practical experience in manufacturing, but he knew what constituted a salable product. Besides, he was possessed of a keen observation and no little executive ability, and in the course of a year or two, under the careful tutelage of the president, he demonstrated his worth completely.

To balance his organization in another way was the idea of an Ohio metal-furniture manufacturer in choosing for his new general manager, to have direction of both production and sales, his shop superintendent. He had been troubled for years with a flood of special orders, and he wished to have one in control of the two ends of the business who had a vivid appreciation of the effect on manufacturing costs of promiscuous departures from standard. The new executive speedily proved his value by training the sales force to push regular lines almost exclusively.

Logically, foremen should be in line of promotion for the higher positions. Workmen are much more commonly fitted for foremanships, however, than foremen are qualified for larger responsibility. For one reason they usually lack the broad outlook requisite, the ability to keep all ends in view and to keep their balance under stress. Again, for men who shall have general direction of work, some technical qualifications are desirable if not essential. Foremen heretofore have not been fortified for advancement in this respect. For the higher positions, accordingly, such sources of supply as are not decided by the employment of young men of special qualifications must of necessity be largely outside.

But the demand for men of this type is always in excess of the supply. Full-fledged superintendents and factory managers are not often found foot-loose and free. It is necessary as a rule to bid for the service of such men, and sometimes to bid high. Even then it may be impossible to get the man you need when you need him. Subdivision of duties, with personal assumption of the apex-responsibility, must then be the temporary resource. When men cannot be found for your pet scheme of reorganization, the scheme must be fitted to the men available.

HOW THE PERSONALITY OF THE HOUSE MAY BE DEVELOPED AMONG ITS EXECUTIVES

ONCE an organization has been manned in the first rough fashion, comes the "continuous performance" of training and adapting the men to the new work. Here again policies of selection and training lap the policies of organization. Just as the work is most effectively done only when the type of organization and the personnel are shaped together, so the organization once started has certain deep characteristics, which are to be imparted to all if the business is to have uniform momentum. Business houses of individuality are known, well or ill, by the managers they keep. Meet two department heads of such a company and no matter how unlike they are in individual peculiarities, they will have a certain fundamental personality in common. In a certain organization noted for its development of the art of selling, whether you meet the factory superintendent or the sales manager, you will find that he sees the product as something to be sold. One works to make the product, the other knows the inside of getting people to buy it; but both reflect the policy of the house that asks first, "What will the customer say about this?"

Every organization has this house spirit, through the better part of which, probably, the business has won its place. To correct and extend this *esprit de corps* is the essence of the development of executives. Not only must men be placed to balance the tangible needs of the business, but beyond that they must fit the business in an intangible way for which the personality and intuition of the manager must remain responsible.

Certain of the activities of the business which are universal to the success of all departments furnish a training for the executives out of which, often, this company personality develops uncourted. Take the very homely problem of filling an order on schedule. The routine involved in getting the work done on time is the sum of the totals of what each department or branch of the business does with that order. One manager, seeing this, immediately started foremen's meetings, not only to facilitate the progress of the work but to train his foremen. In the broad, balanced study of this everyday problem was the nucleus for making a superintendent from one of the foremen. Properly planned, such meetings offer tomorrow's executives training in policies and methods which otherwise would never be passed on to them, except by hearsay or under emergency conditions.

ENCOURAGING TEAM WORK AND INITIATIVE BY MEANS OF SCHEDULED SHOP MEETINGS

METHODS of handling shop meetings are many. In a New York manufacturing establishment, twenty men gather around the conference-room table with the manager once a week. It is the duty of each of the twenty to write the general manager a letter immediately after he reaches his desk every morning. Each of the twenty letters must contain at least one new idea about the concern's activities.

The letters may be long or they may be short—but they must be written. The ideas may be general or they may be minute and detailed—but they must be put down on paper daily. And at ten-thirty each week-day morning the general manager's secretary hands him the best thought of twenty picked executives.

An electrical manufacturing company in the Middle West has a well earned reputation for loyal and efficient lieutenants. Chief among the methods that have inspired this combination of team-work and individual initiative is the reading of the mail each morning in the office of the general manager.

Every incoming communication must pass under the scrutiny of the assembled department heads. That means that every phase of the business is known and passed on by every executive. He knows—he helps—he shoulders his share of the responsibility.

The make-up of the meeting varies but little. The general manager, as reader of the correspondence, designates who shall handle it. This, technically, makes him the leader, though his attitude always is, not "Do this," but "What shall we do?" Ranking thereafter in the conference come the chief engineer, with his assistant; the superintendent of works; and the technical correspondents. These make up the council proper. As an aid, the head of any department may be called. To this group, executive in function, is further added what may be called the "training" group. This is made up of future executives or road men—men who must get the house view as quickly as possible and who are often valuable consultants, because they see with the eyes of a former competitor or from the analytic viewpoint of the man fresh from class or laboratory.

WORK IN PLANNING POSITIONS MAKES MEN THINK AHEAD OF THEIR PRESENT JOBS

OFTEN a department may exist in a business that, because of its contact with all other departments, is a natural training ground for responsible heads. Unless the work of this department is too specialized, the very contact of the men with the entire establishment will give them opportunities to learn. Order and follow-up men, inspectors and instructors have unusual opportunities to get the "management view" of the enterprise. Such contact may be supplemented by general talks on factory policies and methods. In one large manufacturing establishment, a complete explanation of the methods and management of the corporation has been delivered to the foremen in a series of evening meetings. Starting with the forms of corporate organization, the lectures developed into the working policies in handling the factory routine. Such detail topics as standardization, wage payment, methods of figuring costs and directing production were also discussed in the most practical terms by the works engineer.

HOW TO HANDLE AN EXECUTIVE MEETING

Select a sub-committee (to include secretary and chairman ex-officio) to plan all meetings.
Have this committee set a definite time and announce in advance the problems to be considered.
Begin promptly.
Have secretary on hand to take all minutes.
Have sub-committee present order of business at call of chair.
Confine discussion to one item at a time.
Get each man's opinion.
Limit talks.
Keep procedure informal and decide questions by general agreement whenever possible.
Where opinion is divided, put question to a vote and require two-thirds vote to pass, or have someone investigate objections and report for vote at next meeting.
Definitely record all decisions.
Have someone delegated to execute decisions and report progress at each meeting until matter is finished or reduced to a definite routine.
Have decisions neatly typed, signed by chair and secretary, and copy sent to each as soon as possible.
Instruct order-of-business committee what it shall work on for next meeting.
Adjourn on schedule.

FIGURE XV: Committee meetings have a reputation for wasting the time of executives, yet they are so conducted in some plants as to give valuable results. Rules by which the maximum of advice and action can be secured with the minimum of delay are here given as they have been developed in the practice of many companies

A more carefully directed use of the literature of the trade may well form another basis for the training of executives within an organization. In many factories, periodicals and technical reports of the industry are routed to department heads. In an Indiana plant, any department head or individual workman who distinguished himself was awarded a trip to other factories to study "the other man's way." Reports and discussion based upon such reading and field study develop men and enable the manager to judge them shrewdly.

Any separation of planning from operating in the work of a factory makes a place available for the training of executives. If a man can profitably be released from routine and placed where he can think and plan in a specific direction, his position is soon seen to be a natural training ground for greater executive capacity. Thus certain staff men in a line and staff organization and planning room men in the Taylor system are placed in an illuminating relationship to the work of the factory as a whole. Routine men may make good executives and routine may well be a part of the training of every executive. But routine must not rule. The man away from routine has the opportunity to see the business as a balanced organism and to grasp the subordinate importance of the routine in its true relation.

OUTSIDE SOURCES OF TRAINING AND OF MATERIAL FOR EXECUTIVE PLACES

WHEN no department already exists for the natural training of executives, special departments have been formed in large companies. One of the most novel systems and one which combines many elements of different systems is the selecting and developing of a group of young men who are known as scouts. These young men, working in all the ramifications of the business according to a broadly planned "course," become understudies for different main executive offices. By listing the requisites of a superintendent's job, for example, and then putting a man through different departments with his final work in mind, an all-round man is developed to fill the position.

Corporation schools of various types represent an important response to the need for employees trained in their own business home. Notable in this development is the plan of the American Telephone and Telegraph Company, the "long-distance" organization of the telephone industry. Not only are operatives trained under a very definite plan, but normal schools to standardize the work of the instruction staff have been established.

Here and there in the United States the business man is cooperating with the public schools and universities to train men for his business. At Cincinnati, the Schneider half-time plan makes possible the development of executives with a broader point of view than they would have if their training were kept within the walls of either the business or the university alone.

Selected students at the University of Cincinnati work in pairs. The first week student A is at the factory which has agreed to the plan and student B is at the university. The second week student B takes up the factory job where A left it and A takes his turn at the books. Thus the manufacturer can plan and receive the full time of a technical student and at the end of the four years' course can have two men who should have the making of executives, if he wants them. This half-time plan has its counterpart with detail changes in several other cities. Foremen's clubs, night schools and Y. M. C. A. classes also offer instruction in which the management may well cooperate.

Offices of consulting management engineers have of late proved live sources of capable executives. The training young engineers receive as installation men with such companies gives them a cosmopolitan viewpoint on production methods in general and a broad knowledge of actual conditions that is hard to find in a man trained in one place.

KEEP THE CURRENT OF PROMOTION IN THE ORGANIZATION OPEN AT ANY COST

SYSTEMATIC development of men and executives involves expenditure; but it is the highest type of insurance upon the enduring vitality and the growth of the organization. Moreover, if the management will supply hope of advancement, the men will assume most of the burden of their own development. "The one thing beyond all others that is needed for success," declared Frederick W. Taylor, at a meeting of the Efficiency Society in 1914, "whether it be the success of the worker or the success of the intellectual man, is *hope*. In order to give hope you must first of all have in your mind, in the bottom of your heart, the welfare of your men. Scientific management does not come into existence until the owners of a business, all those on the management side, have the development of their men as absolutely the first thought in their minds."

Hope demands a chance at all times, however, and men often develop faster than there is opportunity for their advancement. When they do, it is a healthy sign; but therewith comes a complication of the manager's problem. Workers who are too good for their positions are the most difficult of all to keep satisfied. They are like a stream whose waters have been dammed up and must have outlet.

Nothing could be more disastrous to an organization than to have it looked upon as a mere training school for other places. This is a tendency the manager must rigorously oppose—not by tying down the safety-valve, but by interesting himself further in his men. He must meet the problem constructively and on the aggressive. Higher pay, better working conditions, a more advantageous benefit and pension plan than elsewhere; the ownership of homes in the vicinity; profit-sharing; opportunity to become stockholders—these are a few of the measures that have been found effective in holding good men. Under proper policies and financing, meantime, the business may be made to grow with the development of its men. Beyond this, there is only one way to meet the situation: yourself take the initiative in finding good positions elsewhere for those who have outgrown your establishment. This is a policy of a number of broad-minded and far-seeing managers. These men figure that it pays occasionally to promote a man outside—perhaps to a position where he is a strategic ally—in order to keep the entire organization keyed to the highest pitch.

IV

REORGANIZING UNDER SCIENTIFIC MANAGEMENT

IF there is one factor in making goods on which American manufacturers pride themselves above all others, it is *plant*. We "point with pride" to splendid, glass-walled buildings and rows of intricate special machines. It takes a good while for the edge to wear off of "our new building" or "our new machinery." Good buildings and superlative equipment, in the mind of the average manager, seem the symbols of success. But this satisfaction in permanent improvements has its dangers. There is a chance of over-constructing and equipping to meet the demands of a busy season, only to let the buildings and equipment lie idle during a period of slack orders.

At such a time the factory manager naturally turns to a study of making the most out of what he has. In sizing up the relation of his plant to his business, he probably will find that he is ahead of his time in some "hobby" department and behind in others. Then it is that a real study and analysis of his methods of management and the types of organization already referred to, will reveal sources of loss before unconsidered.

You, for example, have been reading about the successful application of "scientific management," particularly as developed and practiced by Frederick W. Taylor and his associates, to the manufacture of products as varied as pocket handkerchiefs and big guns for coast defense; and you have begun to wonder whether it might not accomplish similar results in your factory. You have perhaps heard that its installation is costly and that labor leaders are in the habit of "resoluting" against it. You have a suspicion, however, that it would not continue to thrive as it does unless there was something substantial to overcome these obstacles, and you are on the point of investigating, with a view to answering your own question in regard to your own plant in your own way.

As a careful investigator, you will first put aside all hearsay and get in touch with men who thoroughly understand the Taylor system. Then you will visit and investigate as many plants where the system is in operation as you think necessary, especially those engaged in lines of manufacture similar to your own. You will talk with the owners, the managers, and the workmen, and if what they say discourages you, perhaps you will stop there.

If, however, you are not frightened, you will next try to secure the services of one of the managers trained by Taylor or his associates. If a real Taylorite is available, get him to visit your plant, spend a day or two looking it over and talking with the superintendents and foremen and yourself. Ask him to make a report as to what is necessary to be done and what it will cost to develop the Taylor functional organization for you and whether the probable results are likely to justify the expenditure.

When you get your report, you will undoubtedly find that it lays the greater emphasis upon the difficulties rather than the advantages of the Taylor system. It will point out to you, for instance, that if you are manufacturing a comparatively simple and uniform line of staple products, and have been in the business for many years, the chances are that you have already systematized your concern to a comparatively high degree and that the gains to be expected from the Taylor system may not be worth much more than the cost of developing it.

On the other hand, if you are manufacturing a wide variety of product which frequently changes, the report will probably point out possibilities of saving and of speed in the manufacture and delivery of product which will strike you at first as incredible.

In any case it is sure to point out that the process of installing the Taylor system is a costly one. While it is impossible to give an accurate estimate without knowing all the details of the present and future development of the business, it is safe to say that in a concern employing one thousand operators the

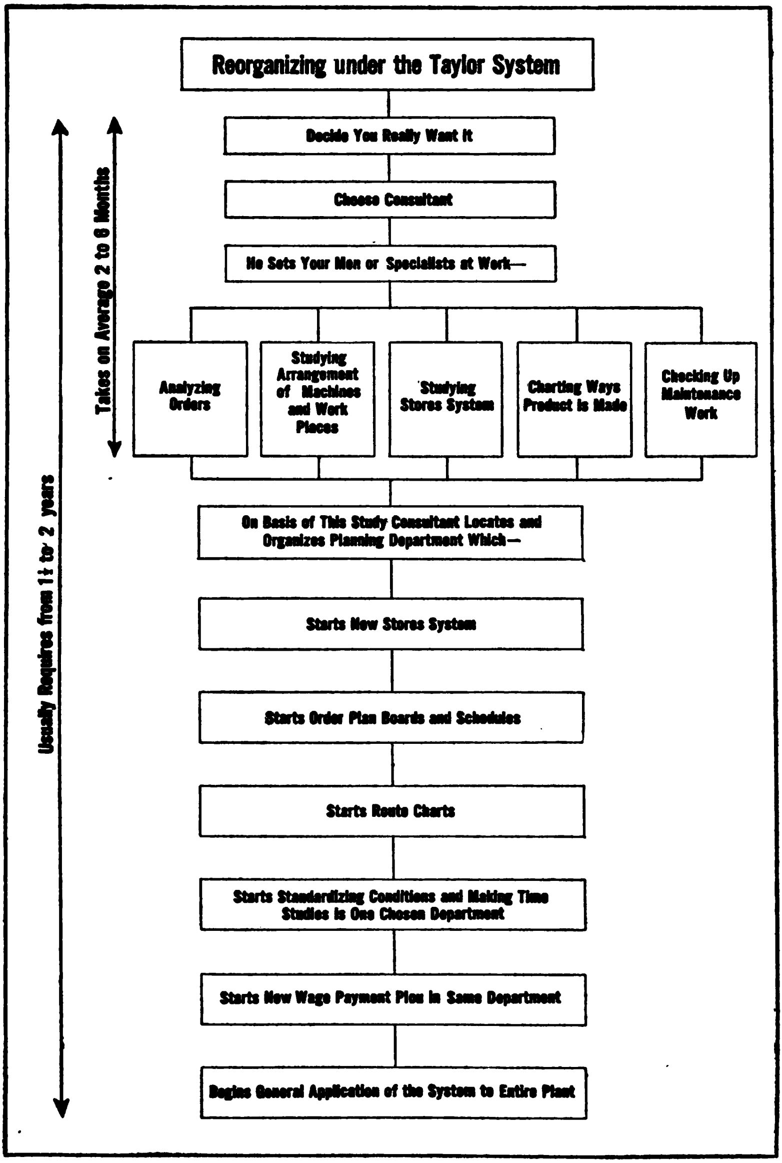

Reorganizing under the Taylor System
Decide You Really Want It
Choose Consultant
He Sets Your Men or Specialists at Work—
Analyzing Orders
Studying Arrangement of Machines and Work Places
Studying Stores System
Charting Ways Product is Made
Checking Up Maintenance Work
On Basis of This Study Consultant Locates and Organizes Planning Department Which—
Starts New Stores System
Starts Order Plan Boards and Schedules
Starts Route Charts
Starts Standardizing Conditions and Making Time Studies in One Chosen Department
Starts New Wage Payment Plan in Same Department
Begins General Application of the System to Entire Plant
Takes on Average 2 to 6 Months
Usually Requires from 1½ to 2 years

FIGURE XVI: Changing the habits of an organization is slow work, and requires tenacity of purpose. The sequence of the principal steps in reorganizing under the Taylor system is here shown and (arrows at the left) the time required to establish each reform in an average plant

system work alone, not including alterations of buildings and equipment, will cost at least ten thousand dollars a year for eighteen months or two years. It is a safe guess that necessary alterations will cost another ten thousand the first year. You are also given to understand that you are not to look for any result other than trouble for the first year and a half, and that the worst trouble is apt to strike you just about the time you think things are going best (Figure XVI).

The difficulty comes not with the workmen, as you may be thinking, but with yourself. You undoubtedly believe when you decide to begin that you are prepared to stand a steady outlay for a year without looking for returns, but after six months of it you begin to get troubled.

One thing that the scientific manager will explain to you in advance is that you have to develop the new system and install it gradually without in the meantime ceasing the operation of the old system and without interfering with production. This is a rather difficult task, and one whose magnitude is rarely appreciated.

It is possible to maintain production under the old method and gradually work in the new, and it has been done, but it is far from easy.

If your investigation and the scientific manager's report lead you to think that you want the Taylor system in spite of the difficulties (and you will have found by that time that labor difficulties are a myth) you will have another session to decide on the best way to go ahead.

TAKING THE FACTORY'S MEASURE FOR NEW METHODS OF WORK

THE first thing the investigator will recommend is that you confine your attention for a period to some one department of your plant which is a fair unit in itself. Systematize this first, not only to make your experiment on a limited scale at the beginning, but more especially to enable you to train a picked group of your best men in the details of the Taylor system as adapted to your plant under the direction of a Taylor expert. When the job is successfully accomplished for that department and you have determined to extend it to the rest of the plant, you will then have your own force of experts on hand. For you understand, of course, that the Taylor group has no corps of experts that it lets out to you. The Taylor man comes alone, or at the most with one assistant, and trains your own staff so that when he leaves, the system does not go with him.

As soon as the scientific management staff is selected, the expert will start your men on several jobs at once. One of the first of these will be an analysis and classification of the orders you get, with reference particularly to the time allowed for delivery, the practicability of carrying your product or parts of it in stock, and the possibility of combining numerous orders for the same or similar things on one manufacturing order. This analysis will probably show that at least seventy-five per cent of your orders are rush. It will be somebody's business to find out which of these really are rush, so that the expert may plan the development of the system with reference to its real needs. Here again, of course, you must understand that the Taylor system is not something which can be lifted bodily from one plant and fitted bodily into another. It is a set of principles of universal application, but the mechanisms thereof have to be adapted to each particular case.

Another of your men will be set to studying the arrangement of machines and work places in your plant, and the development of a layout which will reduce unnecessary travel to an absolute minimum. This new layout cannot, of course, be put into effect immediately, but it should be established as an ideal toward which all necessary changes in the plant shall tend.

A third man will be put to work studying your stores system. It will be his business to determine what storage facilities you need, what materials should be carried and in what quantities, and the proper method of storing, moving and accounting for them. In nine cases out of ten this study will reveal the fact that you have not provided sufficient storage space for the proper handling of raw materials, and still less for the proper storage of partly finished product and of materials in process. It will also show usually that you are carrying too much of some materials, thus tying up capital unnecessarily, and not enough of others, so that you run out of what you need just when you want it for a manufacturing order. It will also show that you are using several grades of materials for the same purpose, when one is the best and therefore the cheapest. Your inventory of stores, if you have one now, will likewise have been shown to be quite untrustworthy.

The stores problem is in most cases a serious one and must be worked out and satisfactorily started before the other things the Taylor system calls for can really be undertaken. While your storerooms are being rearranged, standard racks and bins introduced and your trucking standardized, your materials will be standardized, classified and symbolized in accordance with the Taylor system for easy handling of the stores accounts, and at the same time the necessary forms will be in process of drafting and printing. The stores department is the beginning of the manufacturing process, and one thing that a Taylorite never ceases to hammer in is the fact that no matter where you commence, you can only begin at the beginning.

Still another of your men will begin analyzing your product, making charts to show exactly what material and how much of it goes into each of your products, in what order the various parts of the products should be made and assembled, the types of machines and work places through which they should go, and the operations to be performed upon them on their way through. The preparation of these route charts, as they are called, will keep the best man you have busy for some time, while the stores system is being straightened out. These charts are an indispensable prerequisite to the establishment of the routing system, without which the task wage payment plan—the keystone of the Taylor system—cannot be made to operate.

About this time, also, as the farmer's almanac says, you should look out for trouble in your maintenance department. You probably already have such a department in name, whose business it is to repair breakdowns. The Taylor system requires that the chief emphasis be laid on *preventing* breakdowns, and involves therefore thorough and systematic inspection and the prompt replacement or repair of damaged parts before the breakdown occurs. It takes some time to get this properly going, and so you may as well begin it early.

You may be wondering why nothing has been said about a cost system. Some systematizers begin with the cost system—and, sad to relate, end there. Conditions must be brought to standard before costs can be established and controlled. What the Taylorite is after is more and better production at less cost of money and effort. He is glad if the cost system of whatever sort reflects this result, and he has a cost system all his own if anybody insists on having it, but as a rule he does not bother about starting it until he has other and more direct and important measures well established. This assumes, of course, that you already have a cost system sufficient to keep you off the rocks for the time.

These jobs may be going on in any kind of office or cubby-hole large enough to house the men on them. The administration of the Taylor system, however, requires a properly equipped planning department, and when your preliminary studies have gone far enough, a place in your plant must be selected for the planning department and the necessary equipment provided. This may be from two to six months after the work has begun, depending on the complexity of the business.

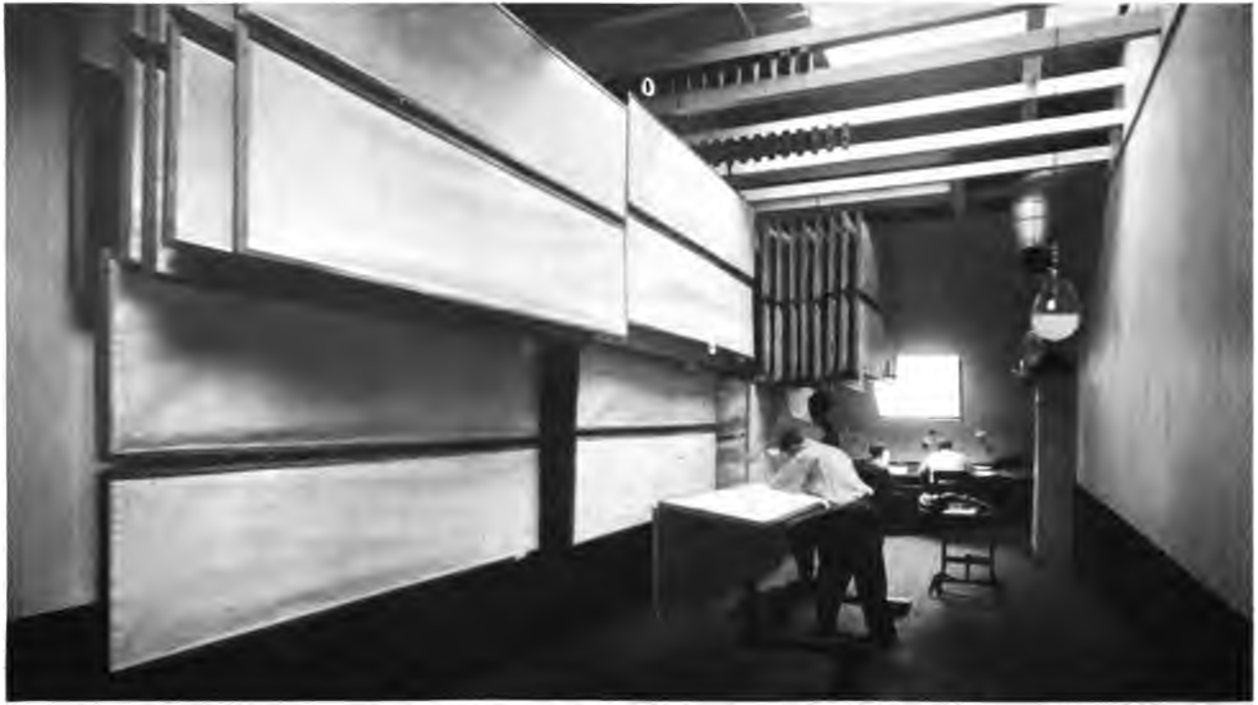
HOW THE FIRST DEPARTMENT MAY BE "BROKEN IN" TO THE SCIENTIFIC METHOD

AS soon as your planning department is ready you will gradually get your stores ledger going, entering item by item on the balance sheets, as they are called, and relocating each item at the same time in its proper place in the storeroom. Each item thus starts from an actual count, and it only remains to keep the balance sheets right and quantities shown by the sheets properly checked up with the quantities actually on hand in the storeroom. Not the least of the advantages of this plan is that it obviates the necessity of a shut-down for annual inventory. This sounds easy, but it is not.

Perhaps the most conspicuous feature of your new planning department will be the order board. This planning board is intended to show the exact status of all orders you have in work. A ticket representing each order in process at each work place is to be placed on the plan board under the symbol for the work place. Also, all jobs ahead, for which the materials have actually been delivered at the machine, will be presented under the same symbol. All the orders you have in the factory, furthermore, whether now ready for processing or not, will show on the planning board. The chief function of this board is not merely to keep everyone posted as to the progress of work, but, what is more important, to insure that there will always be work ahead at every machine and work place in order to prevent unnecessary delays and waiting by the operators between jobs. Another important function of the board, with the aid of an order of work, is to control the sequence in which orders will be started and run through the shop, so that proper relative attention may be given to emergency orders, rush orders and just plain orders.

To get this board running, all the information put down by your best man on the route charts in regard to the manufacture of each of your products must be transformed into route sheets, by which the progress of each specific order is checked; into an operation order for each operation, by which the sequence of operations is controlled; into inspection orders by which the inspection is taken care of; into identification tags to go on materials in the various stages of progress; and into move orders to move the materials when required from storeroom to machine and from one process to another. This means organization of the routing function with its route clerks, tag clerks, order-of-work clerks, recording clerks and window clerks, through whom the plans made in the planning department are transmitted in the form of orders to the shop. It also means development of the specialized supervision known as functional foremanship, by which the old foreman's job is divided among (1) forwarders, or gang bosses, who see that work is kept moving properly to and from machines, and that operators are doing the job ordered by the planning department; (2) inspectors, who are responsible for quality of work; (3) repair bosses, who look out for the condition of machines and work places; (4) instructors, or machine bosses, who train operators in the methods developed in the planning department; and (5) move-men to keep the materials on the move. All these functional foremen must be trained in the conception that they are servants rather than bosses of the operators, and they must have this idea pretty firmly established

Committee sessions in the office of Hoggson Brothers, New York (above), and at the plant of the Addressograph Company are here shown. On the table in the latter conference is a card which reads "Give and Get Suggestions." At the right, above, President Upham of the Consumers' Company, Chicago, appears before a map on which are indicated the local distributing branches



How to relieve the manager's eyes and brain of confusing details and make the big facts of the business stand out in clear relation is an important mechanical problem in the average business. By this ingenious arrangement of "drops," not unlike those on the stage of a theater, one factory makes extensive use of such charts without great expense for floor and wall space before you will get any results from the order board in the planning department.

You will doubtless begin to route the easiest orders first. For the first month or two the routing system will seem so easy that you wonder what the manager was talking about when he predicted difficulties, but this is an illusion due merely to the fact that you do not expect anything of it during that time. You will find half your orders going through the new way and half the old way, and the rest undetermined. After the system has run four or five months and you are wondering what it is going to accomplish, you will begin to tighten up on it and then you will find that the entire process is only beginning to be understood by the people in the planning department and in the shop and that it has been running easily only because it has not been expected to work.

The best way to find this out is to make time studies, standardize the conditions under which the operator should work in order to earn his efficiency reward, and then attempt to apply the efficiency payment idea. That little requirement of standardized conditions will immediately bring out the fact that your stores system is not working half so well as you thought it was, that the moving is anarchistic and that the routing has only got to the point where it discovers what difficulties it is up against. You will then jump to bring your stores and routing systems up to a point where they are really understood by all and made to work exactly as intended, and here the real Gehenna is entered.

This is where the system man puts in eight days a week, to say nothing of nights, and the entire staff working on the system in the factory follows suit. You and the superintendent wonder what it is all about and decide that you had better begin to find out yourself what is going on. If you really take the trouble to find out, you will get into the game and push it through to a conclusion; and if you do not, you are likely to give it up as hopeless, provided your people will let you. The chances are that they by this time have caught the virus and you will find that even if you wanted to, you could not go back to the old system. But if you have the right stuff in you, you will not want to; and the combined energies of yourself, your assistants and the system man will pull you through the critical period with the stores system and the routing system working as well as they can be expected to work without the change in your wage-payment methods.

The thing that ties up the Taylor system and all its details is the task idea. It works something like this: You select one of your best workmen for training as a time-study man and turn him over to the Taylor man for instruction. He is trained in the analysis of jobs into their elementary operations and in the use of a stop-watch, and then begins time studies on some operation near the beginning of the entire process. The elementary time study immediately reveals inefficiencies of machine, power and administration. These are remedied and the time study proceeds under new conditions. Further study shows the possibility of greatly improved methods of operation. These are developed and the workman trained in them and a new time study is made on the basis of the new standardized conditions.

These studies are worked up with the proper allowance for fatigue, and unavoidable delays, and a time is set, in which each job should be accomplished in order to earn the efficiency reward. The workman gets his ordinary wages if he fails to do the job in standard time, and if he does it in the time set, he gets a bonus in addition to his wages, amounting to twenty-five or thirty per cent.

In order for the workman to earn his reward, all the conditions must be right. The right job must be sent to the operator at the right time, the materials must be on hand in sufficient quantity and of the proper quality, the machines, equipment, tools and power must be in the standard condition required by the time study, the workman must be properly instructed in what he is to do, and he must have assurance that the task is properly and reasonably set and that his day wages and bonus rate are guaranteed against cutting. In the failure of any of these conditions, the task cannot be accomplished and the workman cannot earn his bonus.

Once the bonus has been earned, however, you will find that the workman "cries for it," and he is apt to make himself pretty definitely heard if the conditions are not kept up to the standard required. As a result, once the new payment plan is started, everybody becomes responsible for everybody else's success, and you get a general toning up all along the line. For this reason it is advisable to start the task and bonus as early as possible, even before all the conditions are such that it can be made to work successfully and permanently.

This requires a great deal of care and judgment to avoid delaying too long on the one hand, and starting in too soon on the other. The truth is that whenever you start you will find that it cannot be made to work at first; but there is an advantage in beginning at that point, inasmuch as the start shows you why it cannot be made to work and you have an inducement to set about to remedy the faulty conditions which obtain.

As soon as you begin to see daylight through your stores and routing systems you are in position to push vigorously the extension of the wage-payment reform, and from that time you have your troubles on the run. Not that the job is finished at this stage, by any means. Scientific management is never finished, for the reason that you never have time the first time over, to go as far as you know you should go to get the best results. Your best policy is to go over the entire department and all the operations in it and set your tasks and get them going, even if roughly, with the assistance of the outside expert. By the time this is done you will be getting substantial results in the way of greater certainty, speed, better quality and reduced cost, and your own force will have become pretty thoroughly trained in their new duties.

This should be the case two or two and a half years after you have begun. By that time you are ready to extend the work to other departments. This can be done by your own force, with only very occasional help from the scientific manager.

There are thousands of details which have not been mentioned. What has been attempted is to advise the manager who is thinking of developing the Taylor system of scientific management in his plant how to go about it to make up his mind in the first place, and in the second place, if he decides to do it, what changes he is to look for and about the length of time that he should expect them to take.

No attempt has here been made to paint a rosy picture. Scientific management accomplishes wonderful results; but these results cost time and money, and they are not for the man who is looking for three hundred per cent increase in three months.

Scientific management demands not only time and money, but patience unlimited, perseverance and grit, and above all, fairness and justice and a willingness to share the results with the workmen, without whom they could not in the least be accomplished.

In other words, it is only for the ablest, most far-sighted and fair-minded managers. The question whether you will have the Taylor system of scientific management or not depends at least partly upon your own qualifications.

Part II

ESTABLISHING STANDARD METHODS OF WORK

AUTHORITIES AND SOURCES

FOR PART II

Chapters V, VI, and VII. Contributed by Mr. Porter out of his own experience in reducing operation to written standard practice in metal-working, enameling and other industries; together with the experience of J. R. Richardson, Chicago manager, Hotpoint Electric Heating Company, and other executives or staff men in such enterprises as Joseph T. Ryerson and Son, Western Electric Company, Lodge & Shipley Company, Franklin Automobile Company, and others.

V

HOW TO CODIFY FACTORY PRACTICE

WHEN a ship has been launched, supplied and manned, regulations govern its routine navigation; and the captain is freed for problems of policy and to cope with emergency conditions. No less should this be true in the factory. For smooth and effective operation, consistently low production costs, uniformly high quality of product and a loyal, contented working force, all of which are essential to the permanent prosperity of the business, standards are essential, governing practically every routine activity and relation. Standards may well be set up for building design, construction and maintenance; for equipment selection, location, operation and upkeep; for material purchasing, receiving, testing, storing, issuing, processing and accounting. Standards, too, by which men are employed, fitted to the job, trained, paid, promoted, their health and welfare conserved. Standards by which orders are analyzed, routed, scheduled and despatched, and their true cost obtained. And standards by which the organization as a whole is unified and made to work as one man toward a common end. Only in this way can management lift itself above the maze of administrative detail, and get a perspective upon the course of business.

How these various standards are determined and incorporated in the factory practice, and the benefits that follow their application have already been indicated. It remains to discuss how, when the manager has planned and manned his organization, these standards, once set up, are preserved and kept at all times within his close control.

Time was when the average factory operated entirely under the personal direction of its supervisory force—the superintendent and his foremen. What to do, how and when to do it, were communicated to the doers almost wholly by word of mouth. Memoranda of orders to produce were made, perhaps, on scraps of paper, and the supervisors for their own convenience kept certain information in private notebooks. In the office, too, a more or less complete written record of transactions with the outside world—of purchases and customers' accounts—was maintained by force of necessity. But "the less writing the better" seemed to be the creed. In the modern factory a very different view has come to prevail. "Verbal instructions don't go!" is the slogan printed in bold type across the top of a blank used in the Locomobile plant, and it reflects the new spirit which discounts reliance on the memory as well as on the spoken word in operating the factory. So important does Harrington Emerson regard this matter that he numbers "written standard practice instructions" among his twelve principles of efficiency.

WHY AND HOW TO MAKE A BEGINNING IN OPERATION BY WRITTEN STANDARD PRACTICE INSTRUCTIONS

PUTTING on paper the standard practices of a factory greatly facilitates control and direction; this few will deny. That the full effectiveness of an organization is impossible otherwise, some may be inclined to question. As regards a very small factory, perhaps, their question is well-grounded. Where one man can personally supervise all the details, the need for written standards is small. Once the business passes the "one-man" stage, however, the need increases rapidly and if the task of compiling them is put off for long, perilous centrifugal forces set up. While the founder and dominating mind of the enterprise retains active control, the organization may work smoothly enough. When, however, his masterful personality is withdrawn or the business becomes too large for him or any one man longer to grip all its details, disorganization begins (Figure XVII).

Several years ago, efficiency engineers were called in to check the downward coast of a New England metal works, in which this condition was far developed. Begun by two brothers some thirty years before, it had grown rapidly and made the proprietors a good deal of money. Less than two years prior to the reorganization, the brother who had looked after the shop end had died. A man of vigorous personality, he had scorned all system, looked upon clerks as nuisances, and records as superfluous. Consequently his sudden demise deprived the business not only of its driving force, but also of much vital information regarding customers' requirements and manufacturing knacks. After several really capable superintendents had tried and failed to fill the old man's shoes, the financial managers thought it time to send out an "S. O. S."

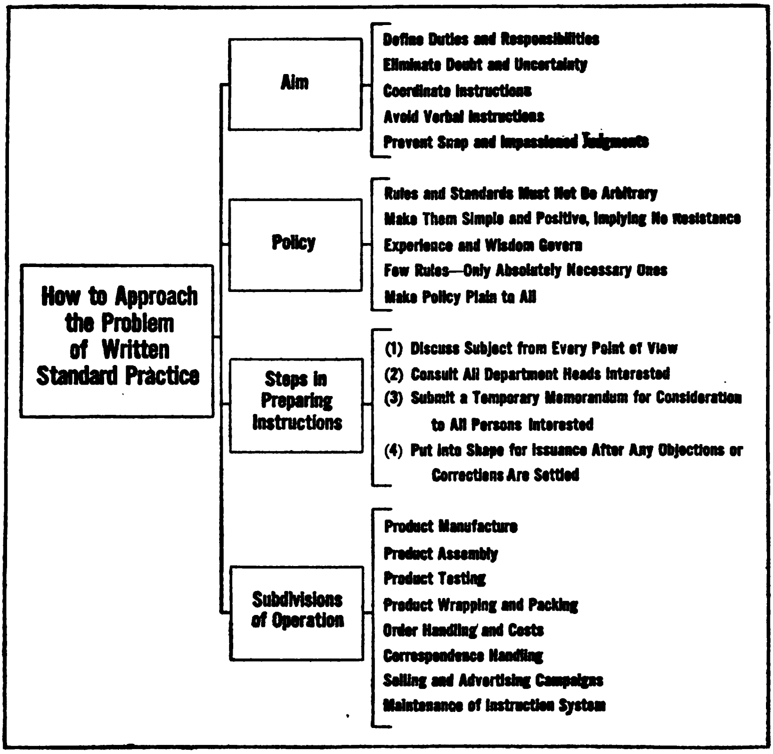

How to Approach the Problem of Written Standard Practice
Aim
Define Duties and Responsibilities
Eliminate Doubt and Uncertainty
Coordinate Instructions
Avoid Verbal Instructions
Prevent Snap and Impassioned Judgments
Policy
Rules and Standards Must Not Be Arbitrary
Make Them Simple and Positive, Implying No Resistance
Experience and Wisdom Govern
Few Rules—Only Absolutely Necessary Ones
Make Policy Plain to All
Steps in Preparing Instructions
(1) Discuss Subject from Every Point of View
(2) Consult All Department Heads Interested
(3) Submit a Temporary Memorandum for Consideration to All Persons Interested
(4) Put into Shape for Issuance After Any Objections or Corrections Are Settled
Subdivisions of Operation
Product Manufacture
Product Assembly
Product Testing
Product Wrapping and Packing
Order Handling and Costs
Correspondence Handling
Selling and Advertising Campaigns
Maintenance of Instruction System

FIGURE XVII: Developing a code of written standard practice involves four main considerations: the advantages to be gained, the policy which should underlie such a system, the specific steps to be taken in developing sound practice, and, finally, the main headings under which instructions group themselves. The vital points under each item are here indicated

What they thought they wanted primarily were a cost system and efficiency wage payment. These were both needed, but before either reform could proceed, the special knowledge necessary to the conduct of the business had to be wormed out of the workmen, dug out of old correspondence, or deduced by the application of engineering principles and common sense.

Because the management was so completely dependent on knowledge monopolized by the workmen, it was at their mercy. They were boss and they made the most of it. A more obdurate labor situation could scarcely be imagined. The workmen opposed every effort of the reorganizers to obtain information. The first man whose work was put under systematic observation quit the second or third day rather than part with any of his "secrets." His motive was to put the management "in a hole," compel it to call off the investigator and reinstate him in his privilege. He thought he was indispensable. But the investigator, working with the most experienced of the helpers, went ahead. Progress was slow and many mistakes were made, but in the course of a few weeks all the essential data were in writing, and a routine was established for keeping the records up to date.

Similarly one operation after another was studied, and the correct practice codified. Stubborn opposition was encountered on all sides, from foremen and men alike. For a time it seemed impossible to get reliable time and material reports. But patience and persistence, coupled with scientific insight, gradually conquered. When the foremen saw that their jobs were secure and that the reform really was for their convenience as much as anything else, they began to fall in line one by one and once their hearty cooperation had been won, progress was more rapid.

A similar story probably could be told about many other factories. Dependence on personality finally enslaves the business to those whose personal interests clash with the general welfare. Emancipation is then a gigantic task and one fraught with grave, sometimes fatal, difficulties. Every manager who has been content to get along without written standard practice instructions may well make the beginning at once. Nor is this final step to good organization so difficult or confusing a task. Like William Lodge, of Lodge & Shipley, you can, by spending a little time each day, compile in a few months a code of rules which will crystallize your experience and views for the benefit of your associates and successors. Or, like Edward L. Ryerson, works manager of Joseph T. Ryerson & Son, you can organize a betterment department in charge of an efficiency engineer who will carry out your ideas. I. A. Berndt, head of betterment in this plant, spends his entire time perfecting standard practices. As soon as a standard is established, he prepares a proper instruction covering it. Then he and Mr. Ryerson go over it, often consulting the various department heads interested. Once an instruction is agreed upon, it is manifolded, one copy is placed in the office files and duplicates are sent to all heads concerned.

The preparation of written standard practice instructions naturally is a progressive task, in fact one which is "never done." For standards are continually to be changed and new conditions are arising almost daily which require standards and instructions. Hence in every reorganization it needs to be the special business of the manager or some one close to him and unhampered by routine responsibility to give this matter his best thought and attention.

Some managers object to written standard practice instructions on principle. "They are so many straight-jackets calculated to deprive men of their individuality," vehemently declared one factory executive. Then he quoted Jefferson's *laisse-faire* doctrine, "That country is best governed which is least governed," paraphrasing it to: "That factory is best run which is least ruled."

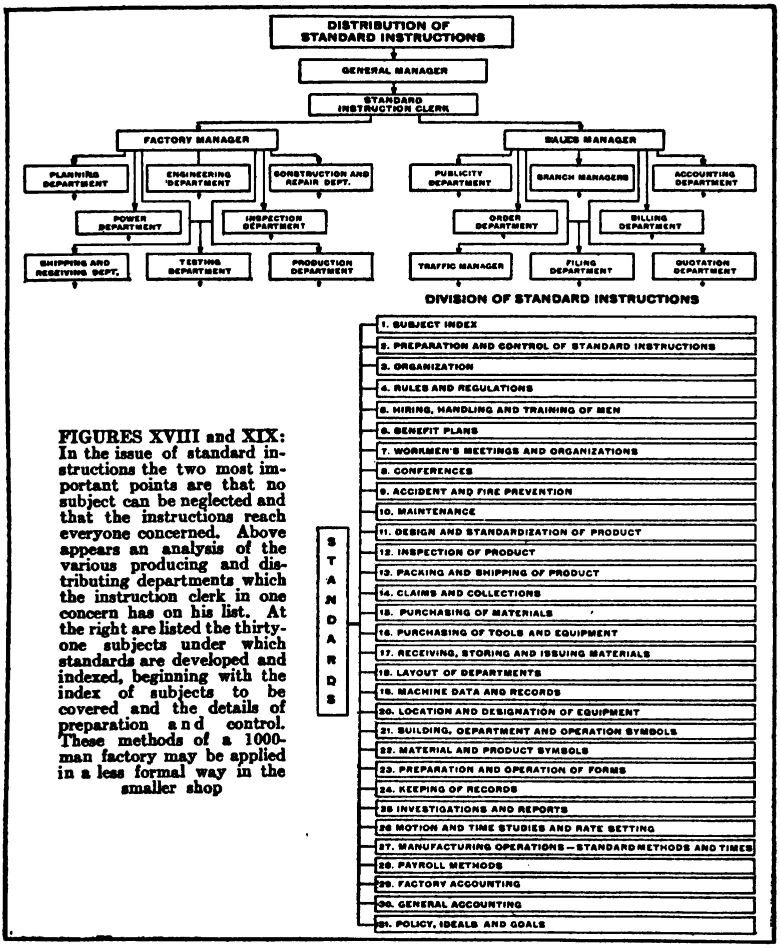
His temperament was of the kind that chafes under rules and restrictions. Personally he was opposed to having a single written rule or standard. But he had no scruples against calling in his foremen to lay down certain common practices whenever conflicting points of view in the shop led to misunderstandings and production delays. And, it was observed, the same errors kept repeating themselves, in spite of his positive injunctions. He had to go over the same ground again and again until his patience would break, and the axe of his displeasure would fall right and left. Many times the blame really was his, as he would privately issue instructions to different heads that conflicted or varied from previous instructions. Confusion thus was inevitable. And so it usually is when dependence is placed on word of mouth and fallible human memory. If he had reduced his instructions to writing and looked upon them as permanent standing orders, his direction would have gained immensely in effectiveness.

Whether or not Jefferson's philosophy is correct, as applied to political units, which can scarcely be said to be "organized for profit," a factory organization must work as one man if it is to return its full effort day in and day out. One mind with its necessary peculiarities, its whims and shortcomings, need not do the thinking for all; but all must serve faithfully certain tested principles and practices. Individuality has plenty of latitude for expression, even in the most closely controlled institution, in devising and suggesting new methods and in seeking always to better past performances. It is a wrong sense of individuality which would conform to no common rules and regulations. So doing places the personal privilege of the individual above the good of the group.

HOW WRITTEN INSTRUCTIONS INSURE THE FACTORY AGAINST IMMEDIATE AND EVENTUAL LOSSES

WHEN instructions are expertly compiled, so as to reduce personal friction, and are accepted by the men as enabling every one to earn more, it is difficult to see how the true liberty of the individual is circumscribed. Rules might cover such petty details of conduct and be couched in such terms as to stifle initiative and provoke a sullen antagonism. But that is a fault of the application—not of the principle. Forms are written standard instructions. They are in reality, as George D. Babcock, production manager of the Franklin Automobile Company, has expressed it, "instructions developed from the fundamental laws of the system," providing a definite, uniform and indispensable arrangement for the distribution of information throughout the plant. To classify and codify standard instructions in general is simply to extend application of the same logical principle.

When the factory manager quoted above saw how friction was reduced by the first set of standard instructions issued, those governing product inspection, his attitude began to change. Soon not even the president, who had been an early convert to the plan, showed keener interest. It was high time, for the president, who had grasped the full possibilities of written standard instructions and was throwing the entire force of his personality into their preparation, was in no mood to tolerate even a show of indifference to the program. He was master of the business. He had


DISTRIBUTION OF STANDARD INSTRUCTIONS
GENERAL MANAGER
STANDARD INSTRUCTION CLERK
FACTORY MANAGER
SALES MANAGER
PLANNING DEPARTMENT
ENGINEERING DEPARTMENT
CONSTRUCTION AND REPAIR DEPT.
PUBLICITY DEPARTMENT
BRANCH MANAGERS
ACCOUNTING DEPARTMENT
POWER DEPARTMENT
INSPECTION DEPARTMENT
ORDER DEPARTMENT
BILLING DEPARTMENT
SHIPPING AND RECEIVING DEPT.
TESTING DEPARTMENT
PRODUCTION DEPARTMENT
TRAFFIC MANAGER
FILING DEPARTMENT
QUOTATION DEPARTMENT
DIVISION OF STANDARD INSTRUCTIONS
STANDARDS
1. SUBJECT INDEX
2. PREPARATION AND CONTROL OF STANDARD INSTRUCTIONS
3. ORGANIZATION
4. RULES AND REGULATIONS
5. HIRING, HANDLING AND TRAINING OF MEN
6. BENEFIT PLANS
7. WORKMEN'S MEETINGS AND ORGANIZATIONS
8. CONFERENCES
9. ACCIDENT AND FIRE PREVENTION
10. MAINTENANCE
11. DESIGN AND STANDARDIZATION OF PRODUCT
12. INSPECTION OF PRODUCT
13. PACKING AND SHIPPING OF PRODUCT
14. CLAIMS AND COLLECTIONS
15. PURCHASING OF MATERIALS
16. PURCHASING OF TOOLS AND EQUIPMENT
17. RECEIVING, STORING AND ISSUING MATERIALS
18. LAYOUT OF DEPARTMENTS
19. MACHINE DATA AND RECORDS
20. LOCATION AND DESIGNATION OF EQUIPMENT
21. BUILDING, DEPARTMENT AND OPERATION SYMBOLS
22. MATERIAL AND PRODUCT SYMBOLS
23. PREPARATION AND OPERATION OF FORMS
24. KEEPING OF RECORDS
25 INVESTIGATIONS AND REPORTS
26 MOTION AND TIME STUDIES AND RATE SETTING
27. MANUFACTURING OPERATIONS—STANDARD METHODS AND TIMES
28. PAYROLL METHODS
29. FACTORY ACCOUNTING
30. GENERAL ACCOUNTING
31. POLICY, IDEALS AND GOALS

FIGURES XVIII and XIX: In the issue of standard instructions the two most important points are that no subject can be neglected and that the instructions reach everyone concerned. Above appears an analysis of the various producing and distributing departments which the instruction clerk in one concern has on his list. At the right are listed the thirty-one subjects under which standards are developed and indexed, beginning with the index of subjects to be covered and the details of preparation and control. These methods of a 1000-man factory may be applied in a less formal way in the smaller shop

its every detail at his finger tips. But it was beginning to get away from him. To lay down his personality and experience in writing was not only to relieve himself of the breaking load he was carrying, but also to pave the way permanently for more effective control. He was impatient for results because to him completion of the code meant freedom—for himself, freedom to think and plan ahead; for the factory, freedom from reliance on unco-ordinated personal management.

"There is the chart of this institution," he indicated to his lieutenants one day, pointing to the cabinet in which were kept the office copies of the standard instructions on which he and the efficiency engineer had been working almost night and day for several weeks. "When these directions are finished, the entire plant can be destroyed and duplicated without serious difficulty; or should I die suddenly, whoever takes my place will be able to take hold and run the business as usual."

He was right. A thorough-going code of factory practice is the best possible business insurance. To an industry it is what plans and specifications are in construction work, what the knowledge of the past handed down in books is to the present, what the records of today will be to the future. Only knowledge trusted to the human memory is perishable. It is a wise factory manager who gets every essential fact about his establishment on paper, classified and codified for most convenient reference. To do so is the essence of good business judgment.

There is, moreover, an immediate dividend to be had from a code of factory practice. "If you want to find out how little you know about a subject," some one has said, "start to write about it." So when you start to prepare standard instructions, you will doubtless be surprised at the many things on which neither you nor your assistants are clearly informed. Both you and they have been depending entirely too much on the traditions possessed by certain workmen, which they have picked up in practice or fallen heir to, and kept to themselves. You will find, too, not only many wrong practices of which you were not aware, but many tasks indifferently and irregularly done because responsibility for them has never been definitely centered. Before instructions can be written on many points, not a little research and study of the most profitable sort will be necessary.

Two ways of preparing a code of factory practice are in use. One is to write the instructions in the order of their apparent need, numbering them serially and cross-indexing by subject. This is the natural procedure. You will better attain

LIST OF SUBJECTS IN THE HOTPOINT ELECTRIC HEATING COMPANY'S EXECUTIVE FILE OF STANDARD INSTRUCTIONS

General Class

1—Standard instructions from main office.
2—Chicago office instructions covering handling of work in the organization.
3—General, or temporary, instructions issued by main office to organization in general for handling of advertising campaigns or special reports.

Folders

1—Advertisements (Folder containing copies of all advertisements)
2—Appliances
3—Business articles in magazines (clippings)
4—Campaigns (Folders on each selling campaign in progress)
5—Chicago office (Folders for Billing, Employment, Filing Service, Printing, Purchasing Sales, Stockkeeping, Shipping)
6—Reports
7—Selling arrangements (with jobbers)
8—Technical information (copies of letters to customers explaining technical points and any other technical data regarding precedent. Used by sales force for reference)
9—Printing department
    a—Printing department instruction
    b—Samples of all circular matter
    c—Crystaloid signs
    d—Cooperative cuts
    e—Guarantee tags
    f—Jobbers' catalogs
    g—Cooperative catalogs
    h—Lantern slides
    k—Letterheads
    i—No. 110
    j—No. 218, etc.
10—Selling contracts
    a—1914 selling contract
    b—1915 selling contract
    c—with suppliers
11—Export (Filed according to countries)
12—Form letters (Models for future letters)

FIGURE XX: Some of the subjects under which standard instructions are filed at the Chicago office of the Hotpoint Electric Company are here listed. While this suggests the general method, each plant will require its own analysis to suit individual conditions

results in the end, however, if before the first instruction is prepared you develop a complete plan on their preparation, indexing, issuance and control. In the plant previously referred to, this was the method followed.

First the work was classified and a folder prepared for each subject that was to be covered by a written instruction (Figure XX). Then instructions were prepared governing the *preparation* of instructions; the language to be used, manner of emphasizing items, paragraphing, size of sheet, margins, indexing and approving (Figure XXII). To work out the classification took weeks. But when it was done, a place was provided for every essential standard and item of information. Indexing by subject was adopted as facilitating quicker reference. Each instruction was also numbered and the number used in filing. Instructions thus were located by subject, but returned to the file by number. Each sheet bore, at the lower left, the names of all persons or departments receiving the instruction, so as to obviate the necessity for a separate record. This plan had the further advantage of compelling the author of the instruction to consider in advance who were the interested persons, not to leave it to afterthought and so perhaps fail to weave into the composition a balanced point of view. The names also insured

HOW INSTRUCTIONS ARE SUBDIVIDED AND ISSUED IN ONE PLANT

Record Forms

Folder for each form filed according to file number

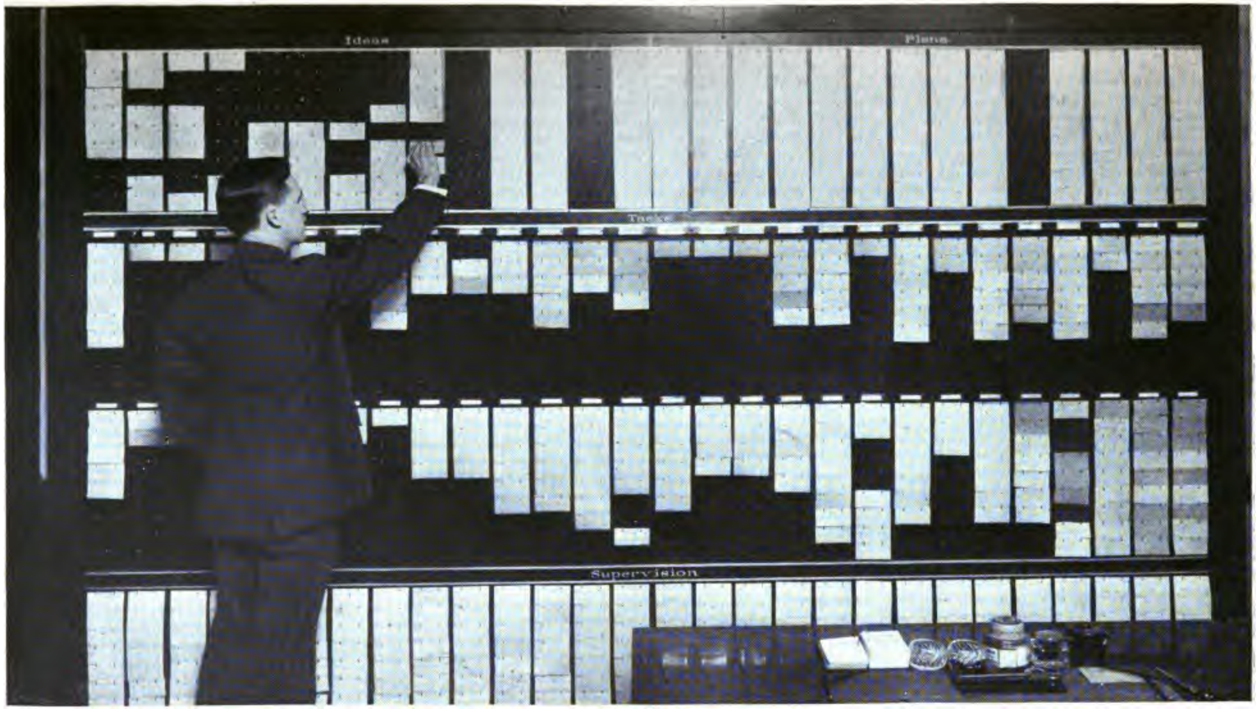
Product Inspection

1. Chief Inspector's Instructions
2. Foundry Inspector's Instructions
3. Cleaning Department Inspector's Instructions
4. Engineering Inspector's Instructions
5. Packing Inspector's Instructions

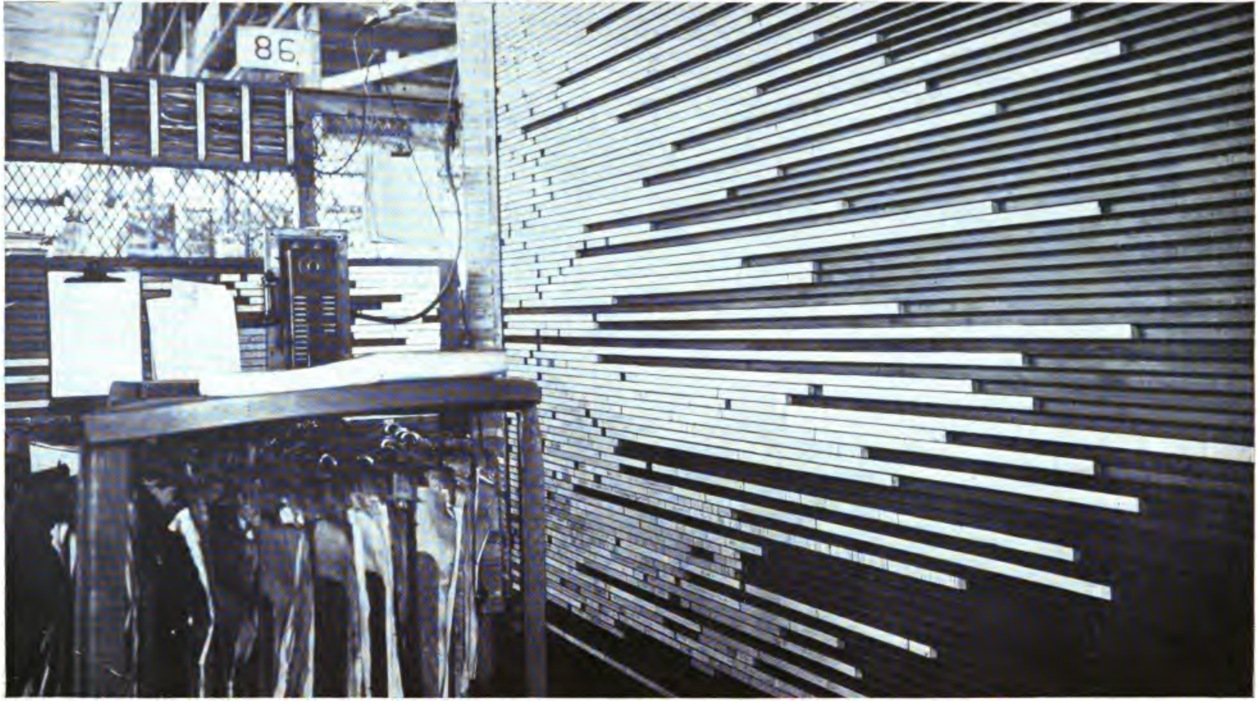
Organization Instructions

1. Factory Manager
2. Production Superintendent
3. Foundry
4. Cleaning Department
5. Engineering Department
6. Packing Department
7. Shipping Department
8. Production Department
9. Timekeeping
10. Cost Department
11. Master Mechanic
12. Sales Department
13. Accounting Department
14. Typing Department

FIGURE XXI: Here are listed the important subdivisions of the instructions relating to inspection and organization in a factory which employs about one thousand men. Certain general instructions will go to all the divisions indicated, while special instructions for each department are required to cover the duties peculiar to it



By means of this planning board an advertising manager is enabled closely to follow the production of printed matter from the idea to the completion of the campaign. If no card hangs on the first hook in any of the "task" columns, the manager knows that one workman or group is idle. A succession of cards in any column provides a definite order of work ahead at that point



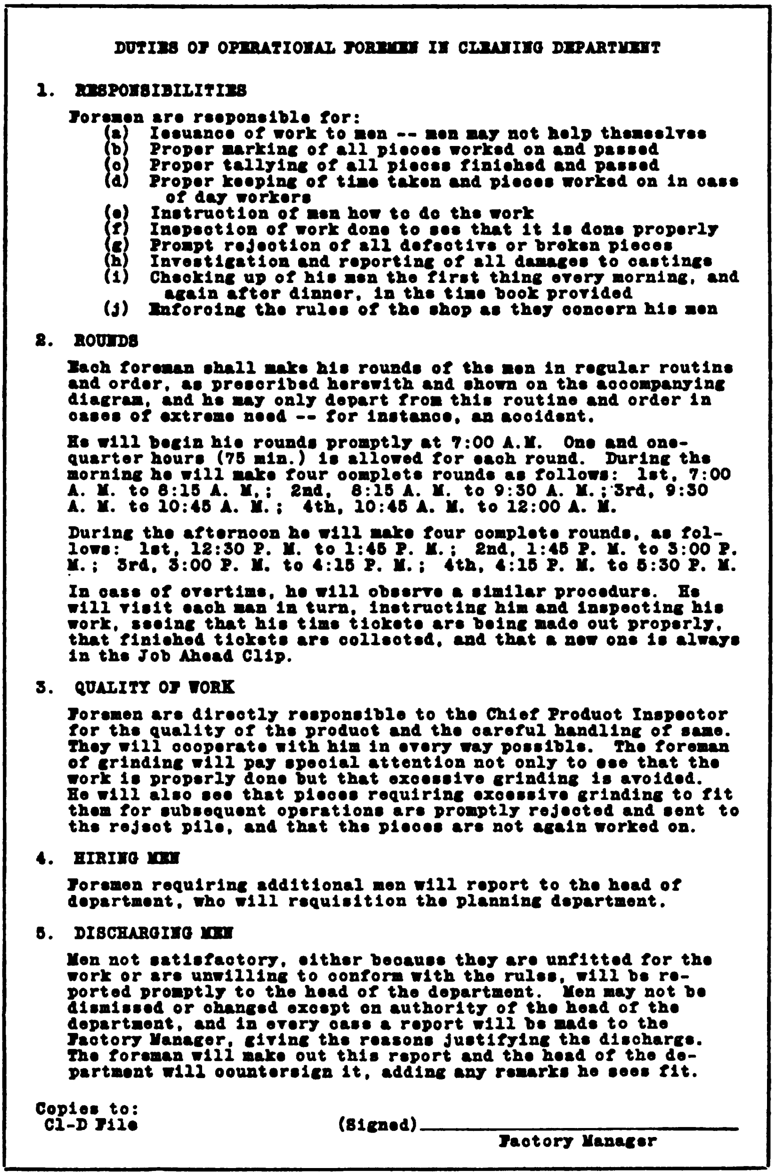
This is a planning board of the Hart-Parr Company at Charles City, Iowa. Each shelf is labeled at the left with the name and number of a machine. Every order is indicated by wooden blocks of a distinctive color, and of length proportional to the time required to execute the job, one inch representing ten hours. Small black blocks separate orders for which material is already beside the machine from orders for which stock has not yet been obtained that no one should be forgotten when the instruction was issued. A check mark after each name indicated issuance; and cancellation, that the head had acknowledged the instruction and accepted it.

HOW TO AVOID ANTAGONIZING WORKMEN WHEN YOU DRAW UP STANDARD INSTRUCTIONS

THAT the effectiveness of the instructions would depend largely on the phrasing used, as well as the form in which they were presented, was early realized. The style, or key instruction was therefore prepared with great care. The importance of these points are well recognized in correspondence and advertising. Their value is equally evident in case of written factory standards, for these must convey positive and definite guidance to men more or less illiterate and dull of comprehension, whose minds respond with difficulty to alien associations and who at best make awkward work of translating words into ideas.

Simplicity of expression, therefore, is desirable. Plain shop talk, pruned of its grammatical errors and coarse vulgarities, is the best medium of expression. It may lack elegance, but it is the language the men understand. The use of graphics, too, where possible, helps wonderfully. Pictures and diagrams are capable of conveying ideas where words fail.

Particularly in the shop rules, it is well also to taboo certain words, such as *employer* and *employee, company* and others which imply a class distinction and tend to make men feel that they are mere labor, rather than *partners* in the business. Call the workers *men,* refer to the company as *we* and *our*. Dispense with the pronoun *I,* the imperative *must,* the restrictive *don't.* Avoid, in short, every word and phrase connoting personal prerogative and the exercise of arbitrary power. Better no rules than those that arouse antagonism with every line. As advertising and salesmanship have fairly well established, there is a sound psychology of suggestion in simple, direct, present tense statements, made in the expectation of cheerful conformance. Giving the reasons where not self-evident, too, is a big factor, for men who understand the *why* of a *how* usually respond in the proper spirit.



DUTIES OF OPERATIONAL FOREMEN IN CLEANING DEPARTMENT

1. RESPONSIBILITIES

Foremen are responsible for:
- (a) Issuance of work to men -- men may not help themselves
- (b) Proper marking of all pieces worked on and passed
- (c) Proper tallying of all pieces finished and passed
- (d) Proper keeping of time taken and pieces worked on in case of day workers
- (e) Instruction of men how to do the work
- (f) Inspection of work done to see that it is done properly
- (g) Prompt rejection of all defective or broken pieces
- (h) Investigation and reporting of all damages to castings
- (i) Checking up of his men the first thing every morning, and again after dinner, in the time book provided
- (j) Enforcing the rules of the shop as they concern his men

2. ROUNDS

Each foreman shall make his rounds of the men in regular routine and order, as prescribed herewith and shown on the accompanying diagram, and he may only depart from this routine and order in cases of extreme need -- for instance, an accident.

He will begin his rounds promptly at 7:00 A.M. One and one-quarter hours (75 min.) is allowed for each round. During the morning he will make four complete rounds as follows: 1st, 7:00 A. M. to 8:15 A. M.; 2nd, 8:15 A. M. to 9:30 A. M.; 3rd, 9:30 A. M. to 10:45 A. M.; 4th, 10:45 A. M. to 12:00 A. M.

During the afternoon he will make four complete rounds, as follows: 1st, 12:30 P. M. to 1:45 P. M.; 2nd, 1:45 P. M. to 3:00 P. M.; 3rd, 3:00 P. M. to 4:15 P. M.; 4th, 4:15 P. M. to 5:30 P. M.

In case of overtime, he will observe a similar procedure. He will visit each man in turn, instructing him and inspecting his work, seeing that his time tickets are being made out properly, that finished tickets are collected, and that a new one is always in the Job Ahead Clip.

3. QUALITY OF WORK

Foremen are directly responsible to the Chief Product Inspector for the quality of the product and the careful handling of same. They will cooperate with him in every way possible. The foreman of grinding will pay special attention not only to see that the work is properly done but that excessive grinding is avoided. He will also see that pieces requiring excessive grinding to fit them for subsequent operations are promptly rejected and sent to the reject pile, and that the pieces are not again worked on.

4. HIRING MEN

Foremen requiring additional men will report to the head of department, who will requisition the planning department.

5. DISCHARGING MEN

Men not satisfactory, either because they are unfitted for the work or are unwilling to conform with the rules, will be reported promptly to the head of the department. Men may not be dismissed or changed except on authority of the head of the department, and in every case a report will be made to the Factory Manager, giving the reasons justifying the discharge. The foreman will make out this report and the head of the department will countersign it, adding any remarks he sees fit.

Copies to:
Cl-D File

(Signed)____________________
Factory Manager

FIGURE XXII: A typical instruction sheet is here reproduced from the written standard practice of a Wisconsin factory. Points to be noted by the manager who is planning such a system are the arrangement of headings and the simple, clear, persuasive phrases in which the duties are explained

An observing foreign visitor who witnessed the maneuvers of the United States troops several years ago, writing of his impressions, drew an interesting comparison between American troops and his home soldiery. He noted little difference, he said, in the technique of their drilling, but a marked difference in their manner. The European soldier responded mechanically to his orders, and his face was dull and expressionless. The Americans, on the contrary, showed spontaneity, as if they were conscious of the purpose behind every order, and might, on occasion, take command. "Theirs to do and die, but not to reason why," may have satisfied the medieval serf and arms bearer, but it does not satisfy either the American soldier or the American workman. He wants to know the *why* of everything, and when he understands the reason and sees the justice of it, the chips fly.

Merely to give the instructions proper form, therefore, warrants the chief in specializing the task of preparation.

Their substance may be dictated by the factory manager or determined in conference. But the actual composition needs to be centered in some one who can "sell an idea." For greatest effectiveness, the typing also needs to be handled by one person. Composition in the case cited was done by the efficiency engineer, working in close conjunction with the chief executive heads; and the typing was done by the president's private secretary, who was also made responsible for the safekeeping of the office file.

VI

PLANNING AND PREPARING THE ESSENTIAL FORMS

AT THE center of every system of written standard practice are certain records so essential and invariable that they have been reduced to standard forms. To some men a form is merely a slip of paper; to others it is a synonym for "red-tape," whatever they may mean by that. As a matter of fact a form is an instruction—a *tool* in the fashioning of work. It is a tool because it is indispensable to, or facilitates, the operation of the business. Where will such tools be needed—the complete scheme of forms and records for all departments—how to design them, what materials will afford greatest economy and service, how to make each blank carry its maximum load and avoid unnecessary varieties, are matters for the management. Separate departments and subordinate officials often lack the perspective to develop proper forms without assistance. More and more, the heads of concerns are laying down policies of general control and expert supervision over all forms and systems.

Of any tool these considerations are pertinent: (1) it shall be suitable to the purpose; (2) it shall be proper in size and shape; (3) it shall be made of the right material; (4) it shall carry explicit identification; (5) those who use it shall be fully instructed in the correct method; (6) one tool shall serve as many purposes as practicable, to avoid duplication and simplify the care and control; (7) the supply shall at all times be adequate; and (8) the cost shall be reasonable.

So of a form, the first requirement is that it shall be suitable to the purpose. This brings up the question, What is the purpose? What condition or combination of conditions has made it seem necessary or desirable? Is the same condition or combination present in other departments, so that the one form will serve several situations? What auxiliary purposes may it be made to serve, as in the assemblage of cost data from time and stores tickets? What information is required on the form and how should this be arranged in order to make the form as convenient in operation as possible? What information shall be required of the shop, how shall this be filled in and by whom? What shall be done with the information thus gathered?

These questions can best be answered after getting clearly in mind the exact place of any proposed form in the general scheme of things—its function in the system of management, its relation to other functions.

Accordingly, a good beginning is to chart the various activities of the business (Figure XXIII). Start with purchasing. A purchasing order of some kind, first of all, is needed. Since all purchase orders require a follow-up, at least one duplicate is necessary, to be filed in a tickler. A copy is also necessary for filing numerically by the serial number of the order. This copy may be made to serve both purposes by having the days of the month from one to thirty-one printed across the top edge and using tickler tabs. But a second copy for filing alphabetically by name of vendor is often desirable, to further ready reference to orders placed. Some notification to the receiving clerk as to when purchases will arrive is also desirable, and this can be accomplished conveniently by having still another copy.

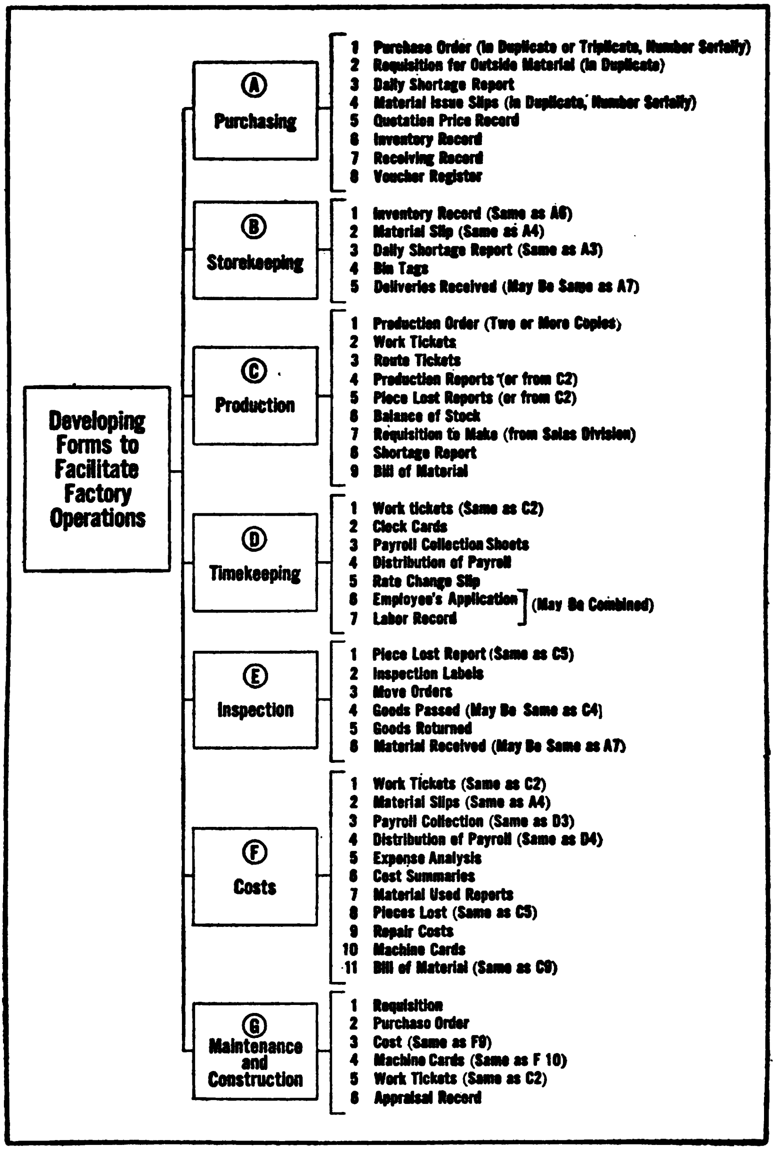
When purchases come in, some definite form of receipt is necessary, which the receiving clerk can fill out and return to the office for checking with the proper invoices. As it is well for the receiver to keep a record of all receipts for his own benefit, this form needs to be in duplicate. If purchases are inspected or tested for conformance to specification, an inspection report also is necessary. To insure that receipts are delivered intact to the storeroom, a further report from the storekeeper is desirable. The same receipt form can, however, often be made to serve all these purposes.

Upon receiving these various reports, the purchasing agent can check his purchase invoices with assurance and put through a voucher for payment. From the same reports the inventory balance can be corrected. An inventory form is therefore needed next. As material issued also has to be recorded, to keep the balance correct, a material-issue slip is further necessary. Where the storeroom is requisitioned by the shop, this same form becomes the shop requisition. In case deliveries from stock are made on order of the production or planning department, it serves as the order. When returned to the office, in addition to furnishing the information by which the inventory balance is diminished, the stores-issue form also becomes the voucher to the cost department for charging costs. It thus serves several purposes.

Before the purchasing agent can issue a purchasing order, he must know from the production side what and how much to purchase and when it is needed. Materials kept in stock are controlled by maximum and minimum stock limits. Daily the clerk who operates the inventory record must therefore report to him those stocks that have reached their minimum. This report can be written on any sheet of paper, but as a good many of them are made in a year, it will save clerical time and errors in reporting if a printed form is provided. Requirements for materials and other items which are not kept on hand, but are bought on the requisition of the shop or planning department, subject to the approval of the factory manager, call for a suitable requisition blank. To check up price quotations, as well as to furnish the data for pricing cost records, some tabulation of previous quotations is essential. Some buyers keep such information in a small notebook, but it better serves the general convenience if a regular form is provided.

These are by no means all the forms that the purchasing function of a business may entail, but they are the principal ones, and in essentials are found under one or another name in every organized plant, because they facilitate buying operations which every business involves. Each serves two, three or more purposes. Purchasing is interwoven with storekeeping and both of these with cost keeping. A thorough analysis of the purchasing function thus reveals not only the essential purchasing forms but also the auxiliary purposes these forms should serve.

Some of the purchasing and storekeeping forms have also a



- **Developing Forms to Facilitate Factory Operations**
  - Ⓐ **Purchasing**
    - 1 Purchase Order (In Duplicate or Triplicate, Number Serially)
    - 2 Requisition for Outside Material (In Duplicate)
    - 3 Daily Shortage Report
    - 4 Material Issue Slips (In Duplicate, Number Serially)
    - 5 Quotation Price Record
    - 6 Inventory Record
    - 7 Receiving Record
    - 8 Voucher Register
  - Ⓑ **Storekeeping**
    - 1 Inventory Record (Same as A6)
    - 2 Material Slip (Same as A4)
    - 3 Daily Shortage Report (Same as A3)
    - 4 Bin Tags
    - 5 Deliveries Received (May Be Same as A7)
  - Ⓒ **Production**
    - 1 Production Order (Two or More Copies)
    - 2 Work Tickets
    - 3 Route Tickets
    - 4 Production Reports (or from C2)
    - 5 Piece Lost Reports (or from C2)
    - 6 Balance of Stock
    - 7 Requisition to Make (from Sales Division)
    - 8 Shortage Report
    - 9 Bill of Material
  - Ⓓ **Timekeeping**
    - 1 Work tickets (Same as C2)
    - 2 Clock Cards
    - 3 Payroll Collection Sheets
    - 4 Distribution of Payroll
    - 5 Rate Change Slip
    - 6 Employee's Application (May Be Combined)
    - 7 Labor Record
  - Ⓔ **Inspection**
    - 1 Piece Lost Report (Same as C5)
    - 2 Inspection Labels
    - 3 Move Orders
    - 4 Goods Passed (May Be Same as C4)
    - 5 Goods Returned
    - 6 Material Received (May Be Same as A7)
  - Ⓕ **Costs**
    - 1 Work Tickets (Same as C2)
    - 2 Material Slips (Same as A4)
    - 3 Payroll Collection (Same as D3)
    - 4 Distribution of Payroll (Same as D4)
    - 5 Expense Analysis
    - 6 Cost Summaries
    - 7 Material Used Reports
    - 8 Pieces Lost (Same as C5)
    - 9 Repair Costs
    - 10 Machine Cards
    - 11 Bill of Material (Same as C9)
  - Ⓖ **Maintenance and Construction**
    - 1 Requisition
    - 2 Purchase Order
    - 3 Cost (Same as F9)
    - 4 Machine Cards (Same as F 10)
    - 5 Work Tickets (Same as C2)
    - 6 Appraisal Record

FIGURE XXIII: This chart illustrates the necessity of certain standard forms in all departments of the factory and indicates by cross-references how one form may be made to serve several purposes. It is a part of good management to plan a clean-cut system of forms by which standard instructions and records are handled with the least possible special work

very direct relation to production. For its supply the shop must requisition either the purchasing department or the storeroom. When the supply is anticipated by the planning department, the issue-slip becomes a definite part of the order system. And the records of these two departments are constantly necessary to the planners in scheduling the work of the shop. No order to manufacture can be issued until it is known that the required materials, tools and supplies are available.

Points of tangency of production with the purchasing and storekeeping functions have already been indicated. The keystone form in factory operation, however, is the production or manufacturing order. This is the means whereby the office informs the factory what to make and when to make it. At least one duplicate is necessary for the office follow-up and record. If more than one department will do work on the order, a copy will need to go to each, if for no other reason than to advise it what is ahead. These several copies are returned to the office, signed and dated by the respective foremen or production clerks, when the work thereon stipulated is completed, and are then filed with the follow-up copy. In this way the office keeps tab on the progress of all orders and sees whether the schedule is being observed. The production order is initiated by requisition of the sales department in case of special orders, or by a shortage report based on an inventory record of finished stock and goods in process. The inventory record in turn receives its information from output and shipped reports. For all these purposes, forms are the accepted instruments.

To identify each lot of work in its course through the factory, as well as to steer it, an identification or routing ticket should be made out at the same time the order-to-make is prepared, and should accompany the copy thereof that goes to the originating department. This remains with the work until processing is completed and it is packed for shipment. Sometimes the same ticket can collect the labor charges on the way, and on the reverse side the cost summary may be compiled, as explained under the subject of costs. Again, if on the coupon principle, it can be made to furnish a very close follow-up on special orders. The original ticket carries a coupon for each important operation. When an operation is done, the corresponding coupon is detached and returned to the office by the factory mail service. Arriving there, it is hung on a follow-up board. Thus the factory manager by consulting the board can know the whereabouts and status of every special order almost to the minute. If the product is one made up of many parts and involving one or more assemblies, identification tickets are of course necessary for each lot of parts and again for each assembly.

The production order carries all the information necessary for its execution, except such detailed instructions as drawings and special instruction cards alone can convey, and it carries the reference to these. If planning is completely separated from execution, each production order before issuance will be analyzed, any new drawings and instructions prepared, special materials ordered, special tools likewise supplied, and work-cards made up for each operation required, stating the time limit and the bonus or premium if any. Not before everything is in readiness will the order be issued. Consequently when it is sent out, execution proceeds with dispatch.

Mention of work-cards brings the production function into contact with the time-keeping and cost functions. Many types of card are in use. So far as payroll and cost purposes are concerned, a card for each job for each man is not absolutely essential. The requirements of planned work, however, narrow the choice to the single job time-ticket. When it is seen that the same form which serves to collect the man's time can also become the medium of planning his activity, any time-ticket which does not admit of this added function becomes merely an expedient.

In the office, to receive the information brought in by the labor and material cards, certain distributing and summary forms are needed. On the one hand are the payroll forms and on the other the expense-analysis and cost-summary sheets. In addition, there are the forms required for bookkeeping purposes. A clear analysis of the cost-finding function reveals every essential form.

On the labor side, in addition to the time-ticket or work-card and payroll sheets, some form of employment blank is almost always necessary and also an efficiency record, although these may easily be combined. In a large plant a number of subsidiary forms may also be required, to afford a definite means of advising the payroll department of dismissals, rate changes and shifts from one department to another. In a factory where the accident hazard is serious, an accident report blank is justified and if physical examination of applicants is practical, for that also, a suitable blank.

Out in the factory, again, processing must be matched with inspection, requiring one or more inspection blanks. If work may be moved only when passed by inspection, a move-order is further needed. If work in process is checked forward from department to department, tally blanks are required. If goods returned are an item, special receipt and inspection forms are necessary for these.

Repairs to machines require first of all a requisition blank by which the shop can call upon the office for action, and then a service or repair-order blank by which the maintenance department is instructed to proceed. The same order form will usually answer also for new construction, machinery installation and special equipment building, when done by the factory force. To compute the cost of such work a special cost-summary form is needed and to rate machines intelligently, an individual machine card on which all the purchase data, installation cost, repairs, depreciation and so on can be listed.

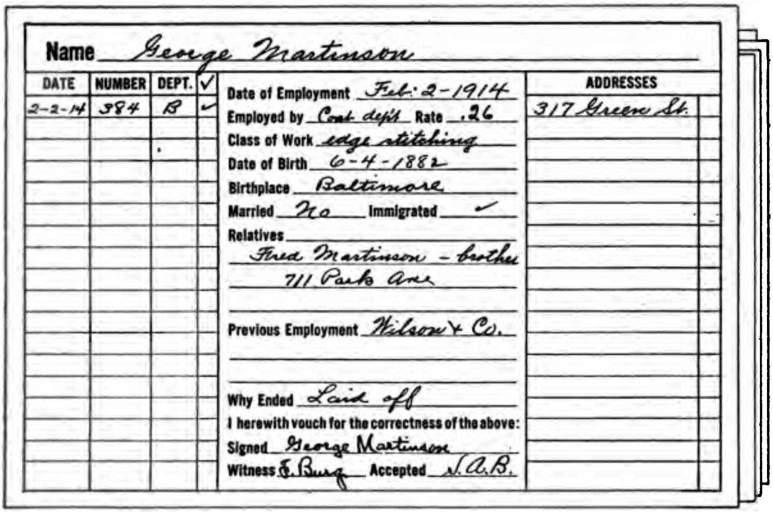
So each function can be taken up in turn and the definite steps in planning, execution and control disclosed. Whenever a form is needed will then be plain. By tracing the overlapping of functions, the management discovers the different purposes one form can serve and thus avoids needless duplication.

DETERMINING THE SIZE, MATERIAL AND CONTENT OF FORMS

HAVING established the purpose of each form, the next step is to tabulate the information required on each. As with other standard instructions, a rough draft of the form may well be prepared and the views of the various interested persons obtained. The A. B. Farquhar Company have found this plan particularly valuable. Their practice is to sketch out a proposed new form on a large scale and then have it thoroughly discussed from every point of view. The revised form, when printed, usually satisfies everybody. Preparation of forms is supervised by the assistant purchasing agent.

Information carried on a form will chiefly govern its size and shape. But its use must also be considered. A shop form needs to be fairly small and compact. Office forms are less limited in this respect, although odd sizes and shapes require special binders or files and forms larger than eighteen inches deep by twenty-four or thirty inches wide are difficult to operate.

Another fact to consider is the standard sizes of paper and card-board stock available. Printers will make up any size specified, but waste may prove expensive if a standard sheet does not cut up evenly. Bond paper comes in sheets 17x22 inches and 19x24, some kinds also in 34x44. All of these are multiples of the 8½x11 or standard letter-size sheet. Therefore, all forms of this stock may well be based on the 8½x11 size. Divided in two the eleven way gives a 5½x8½, or nominal 5x8. Quartered, a 4½x5½, or nominal 4x6. Halved the eleven way and divided thrice, the 8½ way, makes a 2⅞x5½, or



Name George Martinson

DATE	NUMBER	DEPT.	✓
2-2-14	384	B	✓

Date of Employment Feb: 2-1914
Employed by Coat dep't Rate .26
Class of Work edge stitching
Date of Birth 6-4-1882
Birthplace Baltimore
Married No Immigrated ✓
Relatives
Fred Martinson - brother
711 Park Ave
Previous Employment Wilson & Co.
Why Ended Laid off
I herewith vouch for the correctness of the above:
Signed George Martinson
Witness F. Burg Accepted J.A.B.

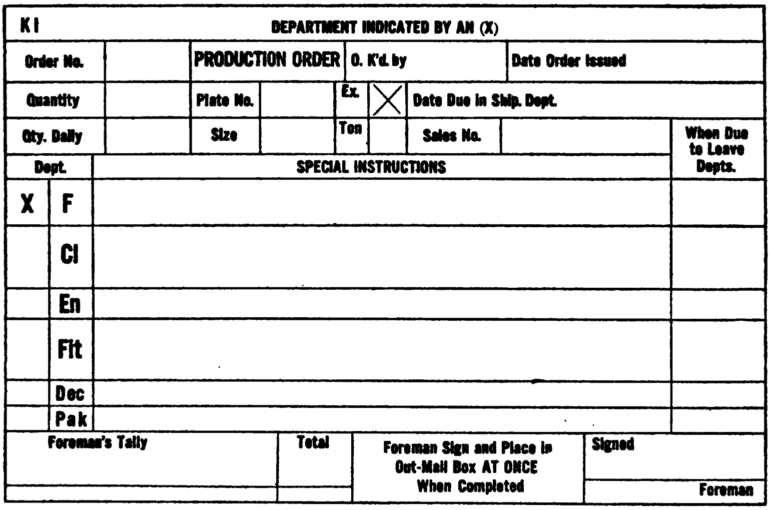
ADDRESSES
317 Green St.

FORM I: A manila envelope serves not only as an enclosure for time-tickets and other standardised forms at the Joseph and Feiss plant, but also as a form itself, carrying the employment history of the workman concerned. Economy of material, space and time is thus obtained nominal 3x5. The 8½ dimension doubled gives an 11x17 sheet—a convenient size for office records which are to be bound on one edge. Doubling both dimensions gives a 17x22 sheet—another good size for large office records. Ledger stock which is preferably used for the more permanent office records may be had on the same basis as bond, the most common size being 17x22.

Manila card-board, for work-tickets, route tags, tally sheets and other forms which receive hard usage in the factory, comes in 24x36 and 22x28. The first size divides up nicely into 6x6, 4x4, 4x6, 8x12, 3x6, 3x9; the 22x28 into 11x14, 5½x7 and 4x5½. For tags, however, it is better to select one of the styles which are standard with tag-makers. Index bristol—the card-index stock—comes in sheets 25½x30½ and 22½x28½. The first size divides with only a half inch waste on either side into 3x5 cards, and almost as economically into 4x6 and 5x8. In working out a size which must be odd, a good method of arriving at the most economical dimension is to make up a complex fraction of which the paper size is the numerator and the trial dimensions of the form the denominator. Then adjust the dimensions until they cancel with the least amount of remainder.

While paper stock is available in other sizes which cut economically to many dimensions, the effort should be to have as few sizes as possible in forms. There is wide latitude for improvement in the average factory in this respect. Standards are sometimes faithfully observed on almost everything but forms. Frequently sizes are varied with a purpose, to distinguish different forms, but it is far better to vary the color and kind of stock than the size. Since most small forms of letter size and under, are filed at one stage or another in vertical files, it saves having special files built to standardize on the regular sizes—8½x11, 5x8, 4x6, and 3x5. You can even get along with as few as two sizes in the factory—4x6 and 5x8. The firm of Joseph and Feiss, have only one size—5x8 and even their purchase order, which might be full letter size, is only 5x8. Some of their office records are, of course, larger. If the time-tickets and all other forms pertaining to the employment function are made standard, all can be filed away conveniently in manila envelopes (Form I), slightly oversized, in a vertical 5x8 file. The size of office forms—cost sheets, payroll, expense-analysis and so on—similarly should be determined in accordance with the stock sizes of binders. These come as small as 5x8, then 8½x11, 11x17 and 17x22.

As to the kind of stock to be selected for any given form, discrimination is necessary. The natural tendency, looking at low first cost rather than service, is to buy the cheapest. But a form which takes pencil poorly and ink not at all, and which comes to the office so used up that the information is illegible is dear at any price. Bond paper comes as light as thirteen pounds to the 17x22 ream, but sixteen pound is about the lightest weight that gives service and for extra rough usage at least twenty pound stock should be employed. Only carbon duplicates which go no further than the office follow-up file may safely be of minimum weight and the poorest quality. Manila card stock comes as light as eighty pounds, but in this weight is very flimsy and tears easily. One hundred and ten pounds is about as light as should be used for factory service, and where an especially stiff form is required, not less than one hundred and forty pounds. The same suggestions apply to index bristol. Bond



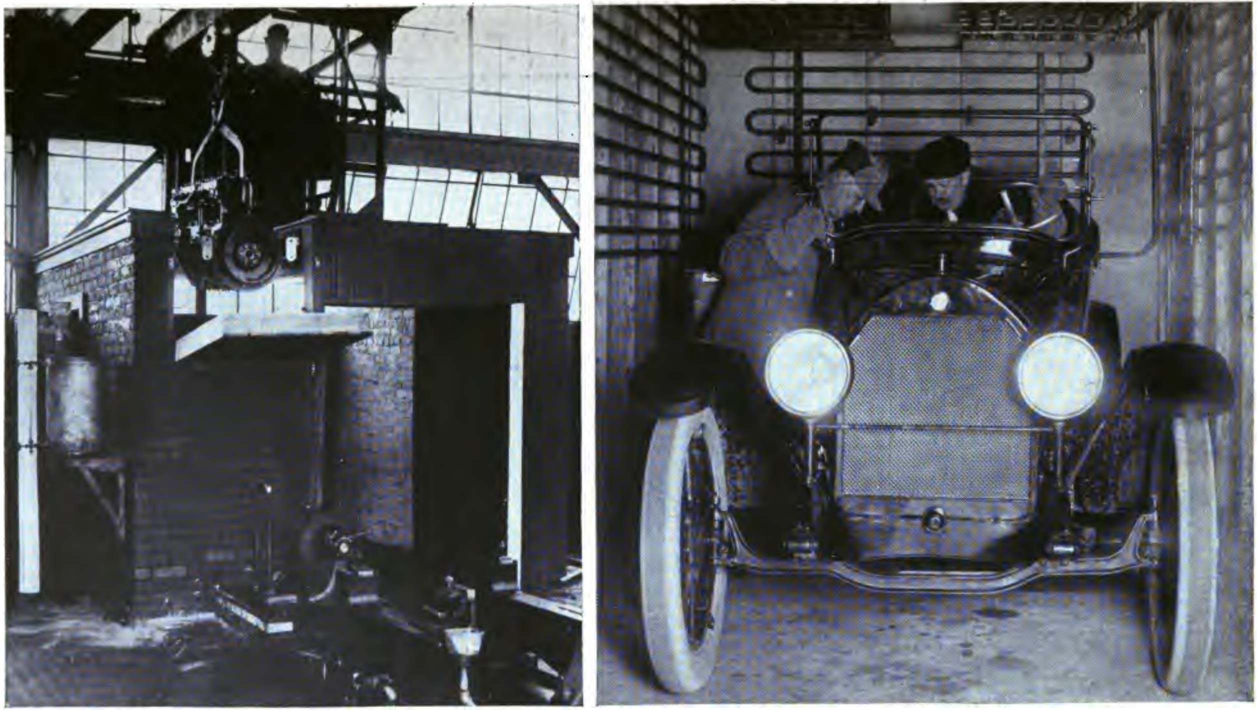
K I		**DEPARTMENT INDICATED BY AN (X)**						
Order No.		**PRODUCTION ORDER**		**O. K'd. by**			**Date Order Issued**	
Quantity		**Plate No.**		**Ex.**	X	**Date Due in Ship. Dept.**		
Qty. Daily		**Size**		**Ton**		**Sales No.**		**When Due to Leave Depts.**
Dept.		**SPECIAL INSTRUCTIONS**						
X	**F**							
	Cl							
	En							
	Fit							
	Dec							
	Pak							
Foreman's Tally		**Total**		**Foreman Sign and Place in Out-Mail Box AT ONCE When Completed**			**Signed**	
								Foreman

FORM II: Clearness, the absence of needlessly large type and an arrangement which economizes space and time are the special features of this form. Originally five by eight inches, the card was so revised as to accommodate the information better in four-by-six inch space and an X to symbolize products, departments and operations. The use of numbers or symbols for machines, furnaces and men also diminishes the pencil work. Not only is space saved by these measures, but also the time of those who must fill in the information, while accuracy in reporting is of course promoted.

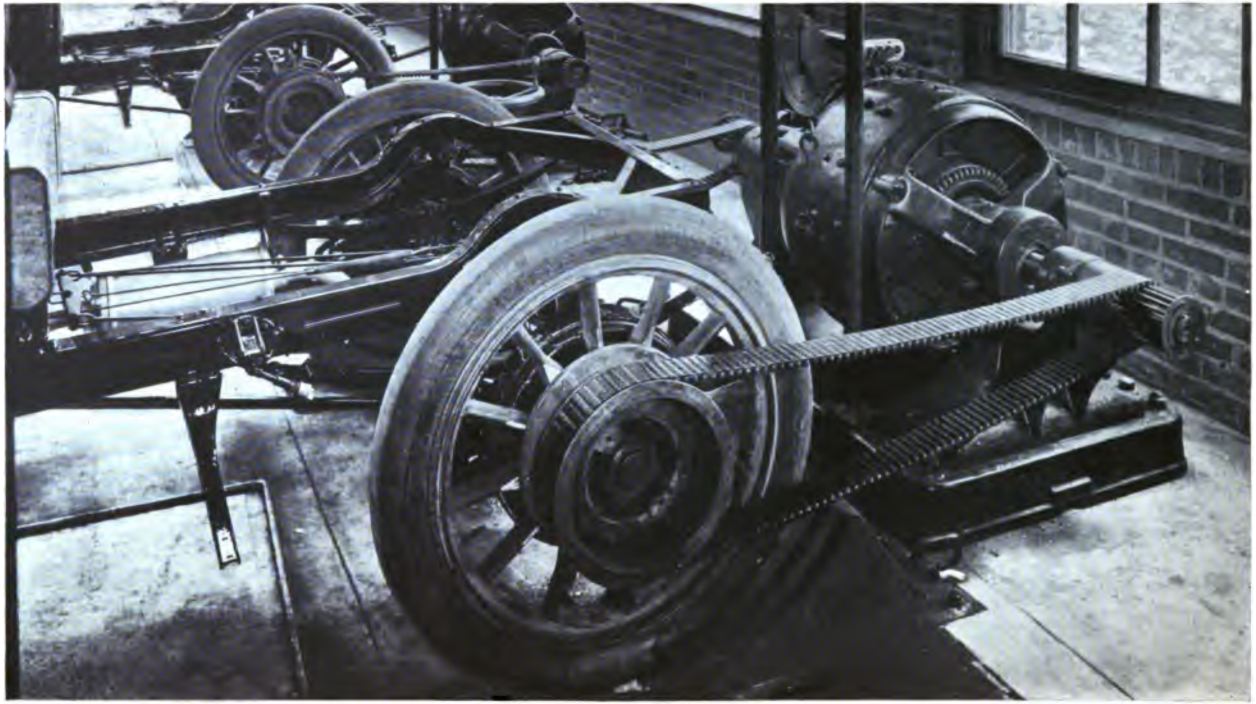
In lettering the spaces on a form, it is well to remind one's self that a form is a written standard instruction. Therefore, the wording should be clear, unmistakable, and strong. It is far better to say simply "Date Due in Shipping Room—," than "Must be done by —," and this in turn is better than "Should be out by —." Simple, direct statements made in the expectation of cheerful compliance are more effective here, as they are in spoken instructions. The type, too, is important. Fairly small, "lower-case," vertical type is better as a rule than coarse or slanting letters or capitals. Emphasizing certain words or phrases by all caps or italics is better done sparingly. The heading needs to be larger, but by no means as large as commonly seen, which only wastes valuable space. In the upper left-hand corner the number or symbol of the form should appear in fairly large type, to facilitate re-ordering and stock-keeping. Following it in very small type should appear the purchase order number, quantity and the initials of the printer, also to facilitate re-ordering.

Large office records, particularly those on ledger paper, are preferably ruled, as much finer and cleaner column and space lines can thus be had, as well as a color distinction which is a big convenience in operating the form. If, however, the ruling required is much broken up and numerous block spaces must be provided at the top and below, a more practical form can be obtained by having a draftsman draw it up on linen or heavy bond paper two or three sizes larger than required and then reduce by photographing. Ruling has the further advantage that it makes a better appearance and less confusing form where both sides are used. When there is much rule work on printed forms the black ink shows through much plainer than ruled lines.

As the expense of forms decreases rapidly with the quantity ordered at one time, every essential detail about a form needs to be worked out before the design is adopted as a standard



Quality is one of the vital considerations upon which the manager himself may well check from time to time. How routine tests of standards are made is indicated by these illustrations: at the left, a sound-proof test-room, to which motors are brought by crane for the detection of noises which indicate defective operation; at the right, the refrigerating plant operated by the Thomas B. Jeffery Company for the purpose of making tests on carburetors at low temperature



In the chassis-testing plant of the Cadillac Motor Car Company, power is made a by-product during the determination of quality. The photograph shows a line of chassis under test and delivering power to generators which send it into the electrical power mains that operate the plant. This refinement of methods cuts off one more item of waste and improves the ratio of quality and service to cost and stocked in quantity. This is particularly true of large ruled forms. If put through hurriedly, the chances are more than even that some feature will prove defective. The new form may prove totally unworkable. Then the entire lot has to be wasted. If imperfect only in minor respects, it can be used, but if the stock is large the inconvenience thereby entailed may be more costly than to scrap the lot and order a new supply of a revised design. It is in this connection that the plan of committee consideration has special value.

In addition it usually is well to print the first supply of a new form on a mimeograph or duplicating machine, or even, for the larger forms, of which a relatively small number is required at one time, to have the draftsman rule up a small supply. Then the design can be tested out before printing it in bulk.

While economy increases with the quantity ordered at one time, a common mistake is to overbuy forms. A blank that suits today, six months or a year later may not suit at all, for conditions are constantly changing and the system is developing. A year's supply ahead is certainly the limit on all forms used in large quantities, even if the storage space available permits of a larger stock. The length of time required to get a fresh supply should be determined and a red card or other significant marker inserted in the last pile where the minimum occurs. This makes re-ordering automatic and dispenses with any inventory record on forms. When the marker is reached, the boy or clerk who is in charge of the vault simply clips a copy of the form to the marker and places it on the purchasing agent's desk.

Before re-ordering, every form should be carefully reviewed for possible changes and time for this should be allowed in fixing the minimum. Of course, the purchasing agent cannot be expected to give intelligent criticism unless some routine for adjusting forms has been provided. In one plant, a note is dictated in case of criticism and placed in a folder, to which the supply buyer refers before re-ordering. As a final check, each form is also referred to whoever carries the responsibility for plant efficiency, for suggestions; and his O. K. is necessary before either an old design or a revised one can be re-ordered.

The same folder also carries the standard instruction describing in detail the operation of the form.

This instruction is prepared by the responsible head or the efficiency engineer, who sends each person interested a copy, bearing on the top a sample of the form (Chapter VII). Thus all get the same idea about the form at once. Among other things, the final disposition of the form is herein indicated—whether it is to be destroyed after it has served its primary purpose or filed for reference, and how long kept. The control value of this provision will be apparent to anyone who has had to pass on the disposition of stacks of old forms which had been accumulating for months and years, or who has hunted for records which some clerk, left undisturbed, had destroyed on his own initiative.

As with all tools, so with forms and all instructions, proper results follow only when the preparation, care and control are specialized. The points are discussed in the next chapter.

VII

ISSUING AND CONTROLLING INSTRUCTIONS

ISSUING a standard instruction is far more than handing out a sheet of paper. Since the main purpose is to bring about greater uniformity in transacting the business of the factory, the habits of nearly every interested person are bound to be disturbed to a greater or less extent. A chemical change is required in mental and moral make-up. Some will accept the new instruction cheerfully and strive earnestly to bring their ways into accord. Others will fail utterly to grasp the spirit, try as they may; while still others will manifest stubborn opposition. Even a simple shop form which departs from the long accustomed practice in some detail will set up a disturbance which requires tact and persistence to allay. To promulgate complete standard instructions, therefore, calls for the exercise of rare good judgment on the part of the manager. Their introduction is really an educational process, and all the arts of the educator are needed for complete success.

To issue one instruction at a time and be sure it is thoroughly digested before issuing the next in logical order is the plan followed by the manager referred to in Chapter V. When about to issue an instruction, he assembles all interested persons in conference, and either he or the efficiency engineer reads it slowly and carefully, explaining in minute detail the purpose and intent. The men are encouraged to ask questions and register any objections. Often new light is thus thrown on the subject. The secretary makes notes on all suggestions and decisions, and the instruction is modified accordingly.

When finally issued, a form is attached to each copy, bearing the title of the head to whom directed, the date, and certain blank spaces for the recipient to fill out. Signing and returning this slip not only acknowledges receipt but signifies that the signer has read the instruction through carefully, understands it and agrees to abide by it. Until all the slips are returned, the office copy is kept in a follow-up file, and if after two or three days a head fails to make his return, he receives a reminder. For a week or so, as he goes about the factory, the efficiency engineer watches the working of each new instruction closely. Many points will come up which require further elucidation. He lends willing aid until tolerably sure that every seeming obstacle to the application is overcome and the men are thoroughly used to the new way.

HOW TO HANDLE SPECIAL INSTRUCTIONS AND EMBODY THEM IN THE CODE

BULLETINS, or emergency instructions, to cover fresh matters that arise or to amend previously issued standards that some unusual situation discloses to be inadequate or in error, are sometimes issued without the preliminaries described, but the recipient, in all cases, is required to sign and return the receipt slip. Before a bulletin is made a standard, or an old instruction revised and reissued, however, the heads are again called into conference. Old instructions are recalled when supplanted, and all except the office copy are destroyed. This is placed in a cabinet of obsolete instructions and kept for a record of the development of the business. Bulletins are distinguished from regular instructions by using pink sheets for them. This insures their getting the proper attention and also enables the caretaker to watch the number of them accumulating in the office file. Periodically he reports to the efficiency engineer as to the bulletins which have neither been reduced to standard instructions nor recalled. In this way a menacing quantity of them is avoided.

Bulletins are issued usually on the initiative of the efficiency engineer or the factory manager, but any shop head, on perceiving the need for a new instruction, may requisition its issuance, setting forth the points he believes should be covered. The men are encouraged to do this, as an instruction originated by their initiative is assured of hearty observance. Often, too, such instructions are intensely practical. The chief promptly gives these requisitions his personal attention and is particular to see that the man's exact ideas are incorporated, in so far as they harmonize with the general policy of the institution.

HOW INSTRUCTIONS ARE ISSUED AND CARED FOR IN ALL DEPARTMENTS

FOR the safekeeping of shop copies of standard instructions, some convenient form of binder or container is needed. In this instance, a special leather envelope was devised, fitted with clasps and of ample capacity to receive all the instructions likely to be issued to any one head. This envelope is kept in a locked drawer in the desk of the recipient. During working hours it may lie on his desk, for his convenient reference or that of his assistants, but out of hours, keeping it in the locked drawer is mandatory. Each lock is unique, and only the efficiency engineer, production superintendent and works manager have master keys.

Office heads are provided with a substantial paper binder, labelled "Standard Instructions," which by rule is kept in the upper right-hand drawer of the desk. The sheets come to them punched ready for insertion in the binder, and are filed in the order received.

Each instruction is issued to the shop heads in a protecting manila folder, in which it is held by brass fasteners. Bulletins or special instructions are issued unenclosed, but a folder is provided in the leather container to receive them (Form V).

Only one set of instructions is issued to a factory department, and for this, the head of the department is held responsible. Instructions pertaining to the special duties of his assistants are kept in the department container. An assistant is at liberty to consult his instructions at any time, but only at the desk of his superior.

All important office men, however, whether they are heads of departments or not, keep their own instructions, as each has a proper place to do so. Each office functionary, in addition to his own instructions and those general to the department, has also the instructions of the men immediately below and above him, so that he may clearly understand all interlocking duties. Each official thus becomes an automatic check on his immediate associates, and can shoulder duties tangent to his own in case of sickness or vacation leaves, or can more easily step into the next position ahead on its becoming permanently vacant. To enable the department manager conveniently and unobtrusively to check on the performance of his men, he is provided with a copy of every instruction issued to his department.

STANDARD INSTRUCTIONS SIMPLIFY THE SELECTION AND TRAINING OF NEW MEN FOR ANY POSITION

BREAKING in a new official in this factory evidently is simplified by the standard instructions. On a vacancy occurring in either the factory or the office, which cannot be filled by promotion, the employment man, upon being requisitioned, refreshes his memory by reading the instructions for the position to be filled. He then makes his selection with the duties clearly in mind. When a man is engaged, after a brief interview with the head of his department to establish proper personal relations, he is given his instructions to read. He is told to take all the time necessary and to ask questions freely about points that are not entirely clear to him. When he takes hold a few hours later or the next day, he is prepared to do effective work immediately.

Because, moreover, his instructions are in black and white, he has no occasion for acquiring at the outset an erroneous conception of his duties and place in the organization, which may take weeks or months to correct, if ever rectified. He is not handicapped by the forgetfulness or carelessness of a personal instructor. Nor is his viewpoint colored by the faulty knowledge, or perhaps purposely misleading counsel of some officious neighbor. Clearly and definitely instructed at the start, he has the maximum of opportunity to make good.

Shop rules and regulations, and general plant instructions, are so issued as to insure a similar benefit all along the line. These instructions are printed in an attractive booklet, with a place in front for identification. At the back is a detachable slip which the man signs and returns, attesting not only that he has read the book carefully, understands the conditions and agrees to conform to them, but that he agrees to constitute himself a committee of one to see that the rules, in spirit as well as letter, are obeyed by his fellows. He hands this slip to his foreman, who before returning it to the office puts the man through a brief test to satisfy himself that the signature is more than perfunctory. At the bottom of the blank the foreman then attaches his own signature, attesting that he has examined the man and found his knowledge of the rules satisfactory. The doubly signed slip is filed away in the man's labor folder. On leaving, workmen are required to turn in their books, and they may not receive the final pay envelope until the slip, with "Book Returned" stamped or written across the face in red ink, reaches the paymaster. This provision is enacted not so much to prevent the promiscuous circulation of the rule books outside the plant, undesirable though this be, as it is to induce the proper attitude of respect for the book.

Folder for Standard Instructions

Keep in Standard Instruction Container

Remove from Container Only for
Reference on the Spot

Keep Sheets Undisturbed

Dept.____________________
Head____________________
Symbol__________________

FORM V: When standard instructions are issued, the first point is to standardize their care and use. These directions appear on the folder which carries each new instruction to the various department heads in the plant described in the text. Instructions are kept in a special container in each department and are open for reference by those interested

Besides the ordinary shop rules and regulations, the book contains full particulars regarding the workmen's benefit plan in vogue, safety-first and fire precautions, first-aid-to-the-injured instructions and what to do in case of fire or explosion, hints as to the care of the person and the value of cultivating proper personal habits. A description of the plant and its product, pleasingly illustrated, and the names of the principal officers and department heads also are included. It is printed in both English and German—the two prevailing tongues spoken in the plant.

The instructions as to fire and accident prevention, hours of work, time and manner of paying off, holidays observed and so on are also hung in a frame alongside of each bulletin board and time clock.

Bulletins to the men at large, to a department as a whole or to the entire shop, are posted on the various bulletin boards, of which there is at least one in each department. The posting is done by the department heads, and each bulletin bears the signature of the head in addition to that of the works manager. Each head thus receives advance information of every bulletin pertaining to his department, and the fact that he signs as well as posts it personally, tends to secure for it proper attention. He also receives an extra copy of each bulletin for his department file.

Bulletins of special importance, particularly such as announce a new policy which is likely to be misunderstood and so create antagonism, are first read to the men in meeting assembled for the purpose. The factory manager himself usually heads these meetings and any points of doubt or dissent are threshed out then and there. Bulletins to a particular department are always prepared in consultation with the department head. Those to the plant as a whole are issued only after a conference between the works manager, production superintendent and efficiency engineer. Such instructions as are not temporary are subsequently embodied in the rule books when next these are revised.

Just as department heads are at liberty to criticise existing standard instructions and to suggest new ones, so the men may register their objections to any shop rule. They do so on the regular suggestion form. They are asked to state their reasons in full and to offer a substitute that will be more satisfactory. To allow them merely to criticise without making a constructive suggestion would be encouraging a wrong mental attitude. Criticism is welcomed by this management, but it must be advanced in the right spirit to receive respectful attention.

Under this plan the men come in time to feel in a measure that the shop rules are *their* rules. Violations flagrant enough to be reported are referred to a committee of the men themselves, and the punishment meted out by this body is usually far more severe than the management would itself think wise to administer; but it is often borne uncomplainingly because practically self-inflicted. An account of violations is also kept in the man's labor record and is one of the factors determining promotion, or retention when a cut in the force is made.

Checked by **Follow-up date**

Subject____

____

____

____

Date	**Date**	**Date**	**Date**	**Date**	**Date**

FORM VI: Three-by-five cards of this type are used in the "automatic" follow-up described in this chapter. Each card fits in an envelope, which is laid on the manager's desk while the card is being used for follow-up purposes on each date indicated. The back as well as front is covered with date columns, so that the card has a long period of usefulness

Enforcement of the rules in this plant thus is made virtually automatic. Wisely prepared, wisely issued, and wisely controlled, their proper observance is a foregone conclusion.

Enforcement of the instructions to department heads is naturally simpler than that of the shop rules, because the heads are on the management side to begin with. But the equally wise precautions surrounding their preparation, issuance and control help greatly to smooth the way.

It is human to relax vigilance, however, and even the manager himself is prone to forget to attend to matters his instructions cover. Observance, therefore, needs to be checked on systematically, particularly of such instructions as apply only at recurring intervals, as every week, month, quarter or perhaps only once a year. J. R. Richardson, Chicago Manager, Hotpoint Electric Heating Company, has devised an exceptionally good plan for accomplishing this. His secretary, who also is in charge of the office file of standard instructions, operates a three-by-five-inch card follow-up file. A card (Form VI) covers each instruction that experience has shown needs checking up at intervals. For example, some time ago complaint was made as to the slipshod manner in which guaranty tags and cartons were being stamped. Investigation disclosed that no standard instruction had been prepared for this item. One accordingly was written, and a card placed in the file, dated to go to the superintendent once a month, as his reminder to check the operation in accordance with the standard instruction. The superintendent indicates his finding on the card and returns it to the office. Similar cards cover other important items on which the practice is liable to lapse with a change in help or for some other reason, and which hence needs to be compared at recurrent intervals with the standard.

A card is also made out for the more important recurrent duties that are liable to be forgotten or overlooked, even though they are covered by written standard instructions. A card goes to the manager of the Service-Display-Case department each week, for instance, reminding him to check up the condition of the display case, to see that the case is cleaned, that no samples are missing, and that all are properly arranged. Another such card goes to the shipping clerk once a month, calling his attention to the necessity of checking over the stock on the shelves to see that none of it has rusted and to restamp the date on the name plates. Cards are also made out, one for each appliance manufactured, which go to the shipping clerk in proper rotation, reminding him to open a package of each article once every so often to see that the material is packed strictly in accordance with the standard instructions.

Each card is kept in a small manila envelope, open at the top and right, and with the upper right-hand corner clipped off. When a card is issued, the containing envelope is placed on the manager's desk so that he may be conversant with the items to be checked that day, and also give his personal attention to any of them if he deems it advisable. At ten o'clock each morning the department heads assemble for a conference, and in the first few minutes the reports are regularly received from the various heads on the matters that have been brought to their attention earlier in the day for checking. It is therefore incumbent upon them to give the cards prompt attention. This arrangement is practically the clincher on the follow-up.

To differentiate the cards, and particularly to enable the clerk readily to assemble all cards applying to any one department, a color scheme is observed. Shipping department cards, for instance, are a dark blue, while those to the order department are salmon and to the accounting department, yellow. The reverse side is covered with date columns, so that one card lasts a long time, in fact usually wears out or becomes too dirty for further use long before the checking-date spaces are filled.

Some follow-ups shortly become unnecessary, and as they do so the persons to whom the cards are sent are privileged to cancel them after consulting with the guardian of the office file. Thus the card follow-up plays an important part in keeping the file from being cluttered up with out-of-date instructions—a danger that must constantly be guarded against. Heads are also at liberty to suggest longer or shorter follow-up periods.

THE FIRST RULE OF STANDARD PRACTICE, "VERBAL INSTRUCTIONS DON'T GO," MUST BE OBSERVED

BY this plan, the enforcement and maintenance of the standard instructions is made so nearly automatic, that the executive is practically freed from all routine. He can go away at any time without any special arrangements and readjustment of the organization, and know that the business will go along as usual. Routine matters are assured attention by the card reminders which come up automatically. Only the matters that are not going through properly are brought to his attention specifically, and these are so few that an absence of a week or more involves no important accumulation.

It is important, once the policy of conducting an establishment by written standard practice instructions is adopted, to avoid the use of verbal instructions and communications. Of course, it is sometimes necessary to issue an emergency instruction verbally, just as it is to order merchandise over the telephone. But even as telephoned orders are promptly confirmed in regular written form, so verbal orders given in the factory should be.

At first there will be some difficulty on this score, for it takes time for men habituated to word-of-mouth orders to break off the habit. The chief difficulty will not be with those in subordinate positions, but with the higher executives, and especially the manager himself. In this respect, however, there can be no privileged characters. Nothing quite so quickly makes the enforcement of written standard instructions ineffective as to have the chief official ignore the established procedure. If he wishes his organization to operate smoothly and to leave him free to lay more ambitious plans, let him set the good example of abiding by the one best way he has been able to set down for each operation, and the force can easily be kept in line.

Part III

MANAGEMENT DUTIES AND DECISIONS

AUTHORITIES AND SOURCES

FOR PART III

Chapter VIII. Contributed by Mr. Porter. In addition to principles and incidents drawn from many other sources, experiences of Frederick W. Taylor and the Dennison Manufacturing Company are cited.

Chapter IX. Contributed by Mr. Murphy and Mr. Porter in collaboration, and presenting the conclusions of both in the confidential study of many businesses.

Chapter X. Prepared in collaboration by Mr. Murphy and Mr. Porter, together with contributions by J. George Fredericks and Mr. Feiker. Among the plants and lines to which particular reference is made are woodworking, metal-molding, automobile and motorcycle manufacturing, corset, cloak, and suit making, the manufacture of bar fixtures, glass-ware, stoves, motors, coke and its by-products, machine tools and cereal foods.

Chapter XI. A collaboration by Mr. Murphy and Mr. Porter, with further material contributed by Ford W. Harris, consulting engineer, formerly with the Westinghouse Electric and Manufacturing Company. Among the lines and plants to which special reference is made are the Link-Belt Company, Eastman Kodak Company, National Cash Register Company, an electrical manufacturer, a tile manufacturer, a watch manufacturer, a maker of water colors, and a motor truck manufacturer.

Chapter XII. Written by Mr. Porter in collaboration with Mr. Murphy. Extracts are also given by James Hartness, former president, American Society of Mechanical Engineers, A. Hamilton Church and Mr. Feiker. Industries and organizations from which particular instances are drawn are the Clothcraft Shops of the Joseph and Feiss Company, metal-ware manufacture, bicycle, motorcycle and automobile manufacture and steel mills.

VIII

KEEPING THE ORGANIZATION EFFECTIVE

PARTIALLY fill a cup and it may be handled roughly; but a vessel full to the brim must be carried with the utmost care. So the management of the average plant is by no means so exacting a task as to keep a highly pitched factory operating smoothly and evenly, without either over-pressure or let-up in any department.

During the early and rapid growth of an organization, the manager's work may be likened to the roughing cuts of the machine tool. The physical progress is evident; measurable results are immediate and so gratifying that a little crudeness here and there, a mistake or two in man-handling or even in policies, seems not to matter. A new and eager demand is perhaps clamoring for increased output. The constant novelty being injected into the situation tends to keep all hands alert. Young and ambitious men sense opportunity in every change, and their enthusiasm is infectious. Turning your organization up to ever higher refinements, however, like the finishing cuts of the precision lathe, requires skill, patience and accuracy. Lapses from standard in such an organization, also, are more quickly noticed and more demoralizing in their example. Management, which so often inclines to be spasmodic, must be maintained in the highly systematized plant even more carefully than operation.

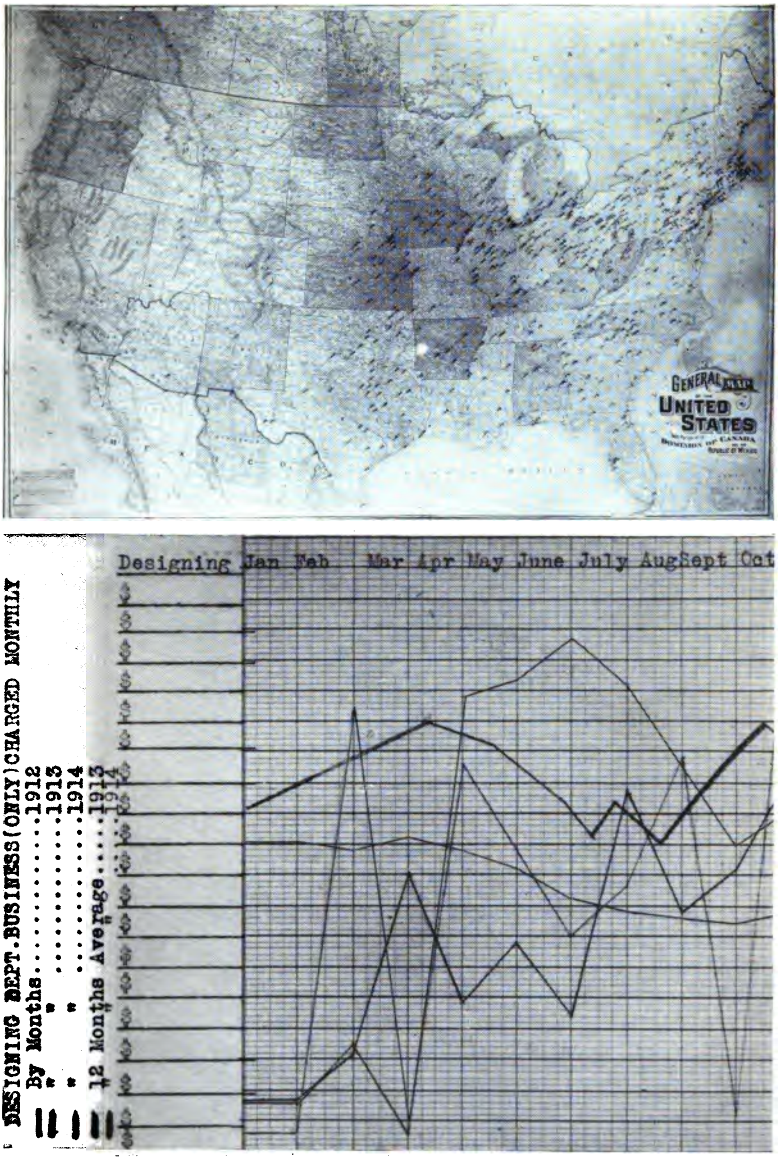
These conditions define the manager's responsibility. He is not merely the master workman, but rather the one man in the plant who can have adequate plans made for the future, can pass upon them and can put them into action. A well-chosen scheme of organization, with duties clearly defined and responsibility definitely focused, men carefully selected for special fitness and promise, instruction and supervision made almost automatic by means of written standard practice instructions—these provisions may relieve him almost entirely of detail (Figure XXIV); yet the business will always need his guiding hand and the inspiration of his leadership.

Every business has its constants, in other words, and these may be reduced to routine. No business man flatters himself, however, that he has standardized everything or cleared his course of perplexities and critical situations calling for the utmost exercise of his powers. Variable, even undetected factors are involved in the course of every enterprise. No one can say with certainty what the men in the plant will do from day to day, or what whims or fads will seize upon the trade, what disputes come up in the distribution of the product, what the political and economic future may be. To keep his perceptions sensitive for indications of changed conditions and his faculties clear to deal with new problems, to know from what quarters trouble may be expected and how to work out the solution of the difficulty, are essentials in the manager's personal equipment for his work.

SUPERINSPECTION—THE CENTRAL PRINCIPLE IN HOLDING AN ORGANIZATION UP TO STANDARD

TO get too deep into the detail is a blunder that always involves a manager in grave consequences. No other result, however, is more serious than his loss of a fresh viewpoint upon the business. The individual workman tends to become blind to his own faults. Routine grows stale and invites neglect. Errors easily creep into the organization and once in, are hard to eradicate. The executive, too, may easily become accustomed to wrong conditions. Without the ability to maintain a detached or impersonal view of himself and his organization, he cannot hope to detect errors quickly, bring them under control and supply safeguards against their recurrence.

"I am positive," said a manager recently, "that I could go into the factory yonder and make suggestions that would save lots of money. I make no claim of perfection for our own plant, but I do believe it is operated much more efficiently than my



Two methods of visualizing conditions and problems for the manager are here shown: below, graphs in which are indicated by colors the amount of designing department business charged monthly for three successive years; above, the map and tack method by which this same construction company locates its prospects and customers in order that sales can be handled with due regard to locality

Fitting production to the trade is further illustrated here. By colored tacks and silk cords on the map, salesmen are routed and directed from the home office. The wall board carries the names and date schedules of all contracts ahead as an aid to the supply and production officials in scheduling and pushing their work neighbor's. In the same way, I suppose, some one with a clearer sense of efficiency than I possess could come into our plant and show us many things we could do better. In fact, I would gladly pay a man fifty dollars now and then to point out what we are unconsciously doing wrong and what we should be doing but have not thought of.''

Superinspection, or ''exceptions,'' as Taylor called it, is what this manager had in mind—a principle perhaps more important than any other in the maintenance of an organization. Taylor's method of inspecting ball bearings, installed by him in an eastern factory, affords a concrete example. The primary inspection was done by a group of girls. For every so many girls, an over-inspector was appointed, whose duty it was to pick out at random and with the utmost care superinspect boxes of inspected balls. None of the girls knew when a portion of her work would be examined, and consequently all were stimulated to maintain the most exacting care. Under these conditions, it became practicable to place the inspection on a piece basis and without sacrificing quality, to cut the cost, increase wages and shorten hours.

In a valve-making plant, the superinspection principle has been applied more broadly. Here the heads of the various departments are organized to keep a critical eye on one another's domains and once a month to render an itemized report. Coaxing and persistency on the part of the manager were required to get the plan working, for at first the men not only were reluctant to pass judgment on others but also were sensitive of criticism. Once their reserve was thawed out, however, each set himself to keep his own record clear and ''get something'' on the others. This was precisely the end sought by the management—to put every man on his mettle as to the conduct of his own department.

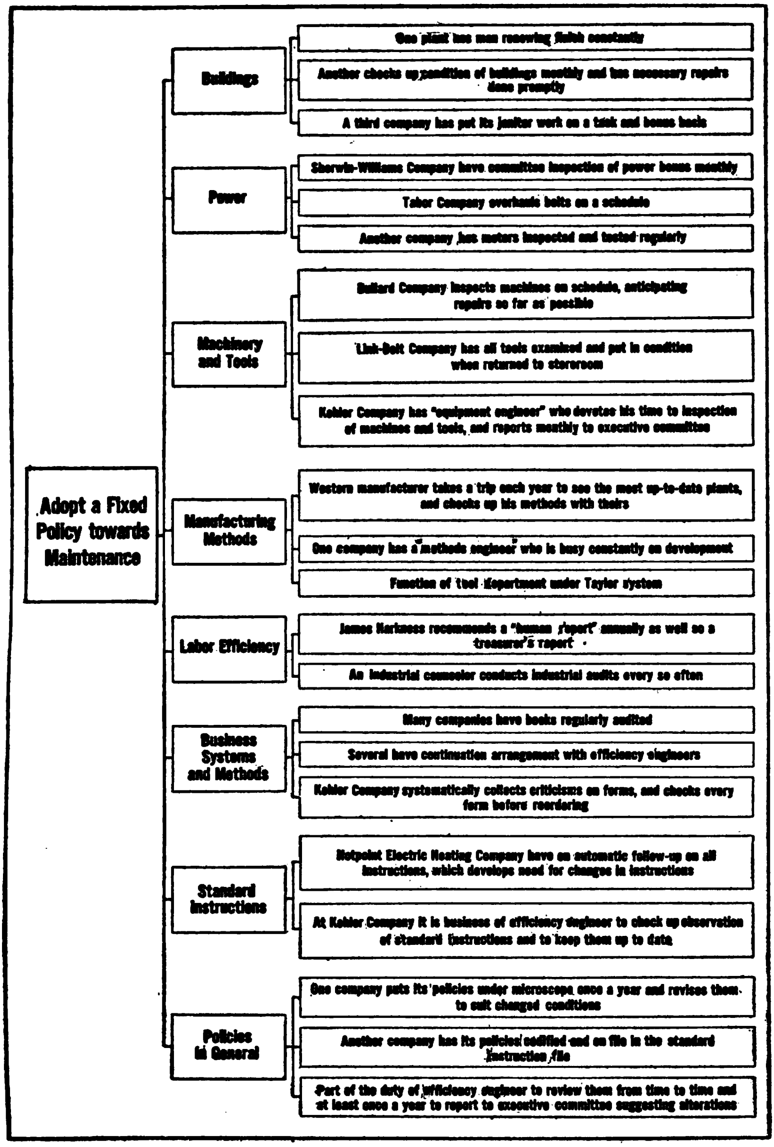
In a similar way the manager, if he has maintained his sense of proportion, can check upon the entire business. As a rule, he keeps clear of small matters. Now and then, however, he jumps in and ''sees a job through'' with the men. If the work has dropped below standard, he brings his fresh viewpoint to it and puts it back where it belongs. In the process, he renews his intimate knowledge of his business. More important still is the example he sets for his men and the bond he establishes with them by his readiness to lift on the load. "Significant details," one manager terms these selected matters into which he digs from time to time in order to assure himself that the business is not growing away from him.

The general superintendent of one of Chicago's largest plants furnishes an example of this type of control. He purposely disregards factory hours, coming and going when he pleases, almost never arriving at exactly the same hour twice and entering each time by a different way. Sometimes he goes to his office first. Again, he will come in by one of the factory doors, to reach his desk perhaps an hour later after an irregular trip through the plant. Occasionally he is down before anyone else. Again, he will stay after all hands are gone. The men throughout the plant never know just when to expect his genial presence and his raking glance. This uncertainty has the effect of keeping them "on their toes" all the time. The result is literally that of omnipresence, but of a far better and more effective kind than that of the old-time manager whose mind had to go over every detail and O. K. every trifle.

SIFTING SIGNIFICANT DETAILS FROM THOSE THAT LACK IMPORTANCE FOR THE MANAGER

ANOTHER factor in maintaining a fresh perspective is to rid every case of non-essentials before it comes to a decision. This executive when in his office cleans up an enormous mass of work in a short time; and his decisions, though usually given quickly, are almost never in error. He always has his facts boiled down in the simplest form before him. Graphs, charts, significant facts and other evidence are worked out before the matter reaches him. When he calls a department manager, too, he expects him to have every essential fact ready for action. To give the chief the kernel of a matter in the simplest way is an established part of the routine.

Here and there an executive is found with this rare ability to maintain a detached point of view. Such a man is his own consulting manager. Every executive should aim to acquire this ability. But "outside" supervision also, as has been suggested, has its place and value. Any new employee has a certain ability



- Adopt a Fixed Policy towards Maintenance
  - Buildings
    - One plant has man renewing finish constantly
    - Another checks up condition of buildings monthly and has necessary repairs done promptly
    - A third company has put its janitor work on a task and bonus basis
  - Power
    - Sherwin-Williams Company have committee inspection of power house monthly
    - Taber Company overhauls belts on a schedule
    - Another company has motors inspected and tested regularly
  - Machinery and Tools
    - Bullard Company inspects machines on schedule, anticipating repairs so far as possible
    - Link-Belt Company has all tools examined and put in condition when returned to storeroom
    - Kohler Company has "equipment engineer" who devotes his time to inspection of machines and tools, and reports monthly to executive committee
  - Manufacturing Methods
    - Western manufacturer takes a trip each year to see the most up-to-date plants, and checks up his methods with theirs
    - One company has a "methods engineer" who is busy constantly on development
    - Function of tool department under Taylor system
  - Labor Efficiency
    - James Hartness recommends a "human report" annually as well as a treasurer's report
    - An industrial counselor conducts industrial audits every so often
  - Business Systems and Methods
    - Many companies have books regularly audited
    - Several have continuation arrangement with efficiency engineers
    - Kohler Company systematically collects criticisms on forms, and checks every form before reordering
  - Standard Instructions
    - Hotpoint Electric Heating Company have an automatic follow-up on all instructions, which develops need for changes in instructions
    - At Kohler Company it is business of efficiency engineer to check up observation of standard instructions and to keep them up to date
  - Policies in General
    - One company puts its policies under microscope once a year and revises them to suit changed conditions
    - Another company has its policies codified and on file in the standard instruction file
    - Part of the duty of efficiency engineer to review them from time to time and at least once a year to report to executive committee suggesting alterations

FIGURE XXIV: In dealing with buildings, tools, stores, men, methods and policies, manufacturers are discovering that the best results are to be had by continual rather than spasmodic watchfulness. Thus, maintenance is coming to be a general policy, and definite follow-up methods, as indicated, have been devised to insure the care of every factor on which the success of the enterprise depends

to criticise and make suggestions. The consultant who is familiar with methods in many plants, in a much greater degree is able to correct bad conditions and make suggestions. Managers frankly recognize the value of audit service to check their accounting and of inspection by insurance specialists to catch up the weak links in their scheme of fire protection. Periodical review by efficiency engineers from without is simply a further application of the same principle. It puts not only the organization, but the manager as well, in the position of the workman who knows that the trained eye of his superior will rest on bits of his work taken at random from the day's output.

HOW TO MAINTAIN THE ORGANIZATION IN RUSH AND SLACK SEASONS —PUTTING RETRENCHMENT ON A STABLE BASIS

AMONG the tests of a manager's clearness of vision, none are perhaps more searching than the call for well-considered readjustments which comes with rush or slack times. In such periods the executive who is blinded by detail and easily swayed by surface conditions, will in the one case conduct the business wastefully, or in the other retrench to the point of crippling his organization. But men and the organization in which they are united are not far different from an electric motor—they work efficiently only when they are fully loaded, with just enough overload to keep the pressure up. How to keep the pace and maintain enthusiasm when business slackens is therefore a real problem.

A manufacturer who was investigating one of the model establishments in which the Taylor system is in operation, put the problem of slack times to its manager. "It's Taylor's idea," the manager answered, "to take men from the shops for the planning department. When business is dull these men return to their places in the shop and the less efficient of the regular shop men are dropped. As every job is on a task basis and the man, to earn his bonus or differential piece rate, has to do his work in the allotted time, the fact that the shop is not crowded with work has no effect on the pace maintained. As in the central station, so many power units are simply cut out or thrown in. The factory works less days a week or less hours a day, but always at the same rate."

Here again is seen a principle—that of conservation of energy or momentum. An express train speeding at sixty miles an hour between two terminal points may burn less coal than a local which makes the way stations at a maximum of forty miles an hour. To overcome the inertia in making each stop and getting under way again accounts for the extra consumption of power. So it is with a factory organization. Decrease the hours of work, lessen the number of men if you must, but maintain the rate of work if you would keep your organization permanently up to standard.

Slack periods are an exigency confronting every business at times, even though the policy of making to stock may bridge ordinary slumps in demand. But the let-down which threatens at such times is by no means the most severe strain an organization undergoes. Such occasions indeed are often opportunities in disguise. Thought naturally turns in slow times to lopping off waste, taking up slack and tuning up buildings and equipment for busier days. Wisely handled, by a manager who sees values truly, this fight against lost motion tones up the health of the concern. In the rush of busy periods, however, particularly if prosperity is unbroken for a number of years, the natural tendency to extravagance flourishes all along the line—if building, to build too ambitiously; as regards equipment, to invest too heavily in new and costly devices; in the case of supplies, to be profligate; with salaries and wage increases, to be over-generous. The result, when hard times ensue, is a sudden tightening of the purse strings. Stern—often excessive—retrenchment measures are adopted. Usually the men are the first to suffer. Either there is a wholesale slashing of pay or a wholesale lay-off, or both.

An organization can be dealt no more stunning blow. Enthusiasm is dampened, loyalty weakened, morale destroyed. Recuperation is slow and difficult. In some instances, the former high standard is regained only after years of arduous effort. The most valuable asset of any business, organization momentum, has been dissipated, and to accumulate it again requires not only time and money, but also the performance a second time of much creative work already done by the manager himself. What executive is equal to such demands, if repeatedly levied upon his powers?

So emergencies—the hills and valleys on the road the business travels—are better anticipated than fought through. Retrenchment itself has in some concerns been brought under a definite policy which keeps it on an efficient level at all times. In one plant the office manager under instructions derived from weekly conferences with the executive committee, to which he regularly reports, keeps the hand of wise economy upon all controllable items. Working closely with the purchasing agent he was able to suggest a slight change in material which without deterioration in the quality of the product saved five hundred dollars per month. Altering another product to come under a parcel post and express weight limit saved three hundred dollars on the first shipment.

A widely known department store has developed an economy committee plan which equally well fits the needs of a manufacturing organization and in some cases has already saved manufacturers from the bitter tonic of deep retrenchment after boom times. This committee (Figure XXV) is made up of one carefully chosen delegate from each of the main divisions of store activity—office, operating, advertising and merchandising. Through their wide acquaintance and the notices they authorized in the weekly house organ which goes to all employees, these delegates soon became the focus of ideas on both savings and wise investments. The president of the company dropped a word to one member which set up an investigation and cut the lighting bill. From the humblest employees came several equally profitable suggestions.

The routine was to appoint a sub-committee to follow out each promise of economy. This committee always included employees whose position and training would enable them to take a fresh yet expert view of the outlay under fire. The sub-committee handed its report to the secretary of the permanent committee, which then digested the facts and sent duplicate reports simultaneously to the head of the department on whom the responsibility rested and to the general manager. While this report was only advisory, the department manager, under the combined pressure of store spirit and scrutiny by his superior, was certain either to take the desired action or to make a case against it.

In every organization, some one should make it his business to challenge every item of expenditure in this constructive way. The "retrenchment manager," as he might be called, needs to be a man thoroughly familiar with the policies of the company as to

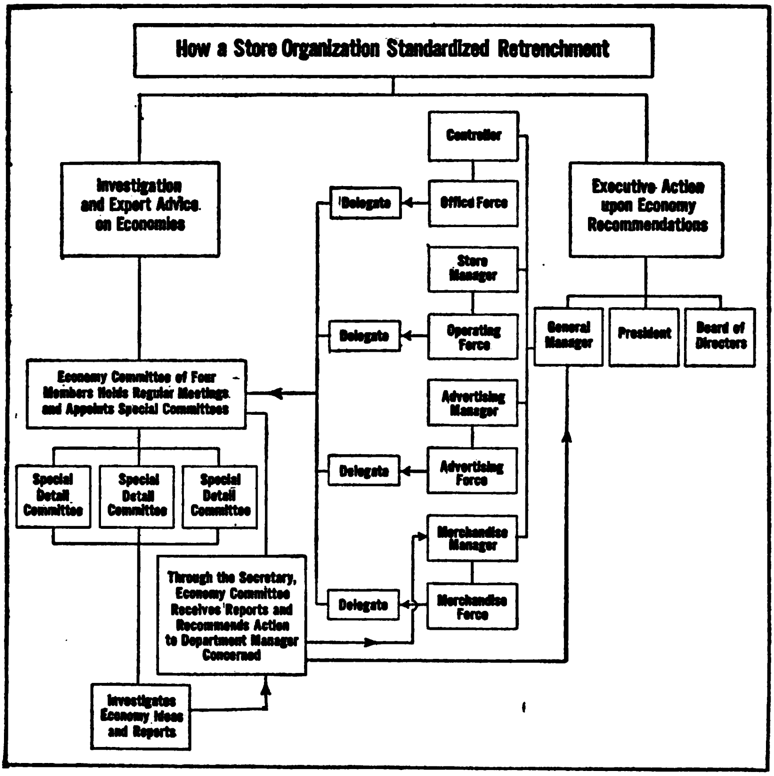

How a Store Organization Standardized Retrenchment
Investigation and Expert Advice on Economies
Controller
Delegate
Office Force
Store Manager
Delegate
Operating Force
Advertising Manager
Delegate
Advertising Force
Merchandise Manager
Delegate
Merchandise Force
Executive Action upon Economy Recommendations
General Manager
President
Board of Directors
Economy Committee of Four Members Holds Regular Meetings and Appoints Special Committees
Special Detail Committee
Special Detail Committee
Special Detail Committee
Through the Secretary, Economy Committee Receives Reports and Recommends Action to Department Manager Concerned
Investigates Economy Ideas and Reports

FIGURE XXV: Retrenchment is dangerous if not done with a steady hand, avoiding both extravagance and stinginess. In a department store a permanent "economy committee" watches the loose ends. Delegates from the four main departments make up the committee, which appoints subcommittees expert in any cost problem to be studied and recommends action in a duplicate report to the department head concerned, and the general manager

cost of product, quality to be maintained and service to be rendered—a man of no false economies, yet with a conscience stern against waste of every sort, who begrudges every penny spent, the sound economic wisdom of which cannot be justified. The committee on economy is even better fitted to develop sound policies governing expenditures. In either case, however, the work must be more than merely critical if it is to be permanent. Putting money in the bank is not the object of a business organization. The true aim should be to lay out all possible funds, but only in such ways that every item is an investment of the highest possible grade.

HOW WISE AND FAR-SIGHTED FINANCIAL POLICIES HAVE BEEN ASSURED

NOT to retrench too deeply in hard times, so E. H. Harriman affirmed, requires the highest qualities of management. To avoid the penny-wise view of both expenditures and profits—to deal justly with the investment and the good will as well as with the board of directors and the financial backers, is a task which few managers may safely delegate. Domination by short-sighted money interests is always a peril to effective operation. By opposing the creation of the proper reserves, the accumulation of an ample surplus, and the improvement of the properties, and by neglecting the friendship of workmen, customers and the public, such stock-holders, for the sake of present dividends and easy berths, sometimes jeopardize the whole future of an enterprise.

It is the statement of an experienced industrial consultant that most factories fail in the going-to-seed period when heavy demands develop for replacement of worn-out buildings, equipment, methods, plans and men. Profits which should have been reserved from earlier years to care for these needs—men who should have been developed—are lacking. In the face of such short-sighted control, what could be more natural than the necessity of reorganization and "a new start"?

"After the early failures on account of a lack of financial support or other miscalculation," says this engineer, "the history of most industrial failures seems to be that the critical time comes through a lack of management foresight in not setting aside reserves to offset the wasting away of capital invested in equipment. When deterioration and obsolescence have worn out the plant and machinery, and there is no reserve fund out of which to replace them, then comes the critical period. The managers simply have used up, or by selling under costs have given away their fixed capital investment. With each industry this period preceding the crisis would be different, but in general it would be between ten and fifteen years. In my estimation, this is worse than paying dividends out of capital.''

In some instances, the manager has shown himself sufficiently strong and far-sighted to arrange financial control in a broad and permanent way. In the Dennison Manufacturing Company, the present head, on succeeding his father, inaugurated a radically new form of corporate organization designed to develop the higher employees to share with him constantly both executive and financial responsibilities. What he calls ''industrial partnership stock'' has been created. This may be held only by responsible employees during their connection with the company and, under ordinary conditions, it alone has voting power. The former common stock was converted into first preferred stock with a fixed dividend rate. Second preferred stock bearing a slightly lower fixed rate also was created, for which the industrial partnership stock may be exchanged when an employee who is leaving still wishes to retain a money interest in the corporation.

The two-fold wisdom of this plan is evident. Not only does it protect the business against exploitation by outside financial interests, but it is also calculated to arouse in every responsible man a strong proprietary interest for wise maintenance and sound growth. The incentive is powerful for each share holder both to do his best and to insist upon the most effective pace in other departments. Owners of the voting stock do not need to be urged to go to school to the manager, but are as eager as he to see his policies perpetuated. Superinspection, under this plan, is always at work throughout the business.

An organization is an intricate machine which, well maintained, should be in better condition tomorrow than today. To make this not only his own ideal, but that of his men, may well be the manager's prime aim. Excessive speeds and sluggish operation alike are bad for both men and machines. It is for the chief to serve as the balance wheel, avoiding both extremes and keeping supply and demand steady to each other. While, therefore, many elements are necessary to business success—strategic location, healthful surroundings, well designed and soundly constructed buildings, up-to-date equipment, correct and scientific accounting, carefully planned and scheduled operation, well organized inspection forces, contented workmen and, for manufacture, a product the public needs, the right leader to direct the organization is after all the great requisite. With him to initiate, to advise, to inspire, to correct, to lend a hand—to keep the plant in line with the market, to look ahead and correct the course of policy—the business may be expected to acquire and maintain smooth, powerful momentum.

IX

HOW THE MANAGER SETS THE PACE

AFTER a ten years' record perhaps as brilliant as that of any concern in America, a certain corporation for two or three years has been slowing down. The sales forces have shown less natural enthusiasm and at times have had to be driven. Several misfortunes have befallen the concern, and, as is so often the case after a concern outgrows the one-man stage, these have not been met with the old-time spirit. The chief has made several far-reaching decisions which have been severely criticised by his own men. Outwardly the company is greater than ever; in the spirit for which it was formerly famous, something seems to be lacking.

Age is coming upon the manager; and with age, less understanding in leading his men. Elusive as is the change, his entire organization has felt the chill of it and checked its momentum. For every manager is the pace maker. It is his spirit which unifies the organization and sets the pitch of courage and optimism, patience and thoroughness. Let him establish a high standard of personal conduct and his men will strive to measure up to it. Let him be eminently fair and just in his decisions and those under him will gain in these qualities. Let him show an understanding of what his men are working for, what they risk and what they are individually ambitious to accomplish and they are more likely to understand his position. On the other hand, let him be pessimistic, dictatorial or biased, and every member of his organization will take the defensive against others. Wherein he has failed to master himself, his organization will manifest weaknesses. Its efficiency in the last analysis is determined very largely by his ability to maintain himself highly efficient at all times.

Many executives have essentially the right combination of qualities, so certain is the survival of the fit, so exacting the test an executive undergoes in establishing and maintaining an organization. But with age and changing conditions, a manager sometimes loses his balanced point of view: unimportant details take on undue gravity, vital matters he passes over lightly or loses sight of. At length he commits an error of judgment which weakens his self-confidence or which more often is apparent to everyone but him. Then you hear it said: "The chief is losing his grip."

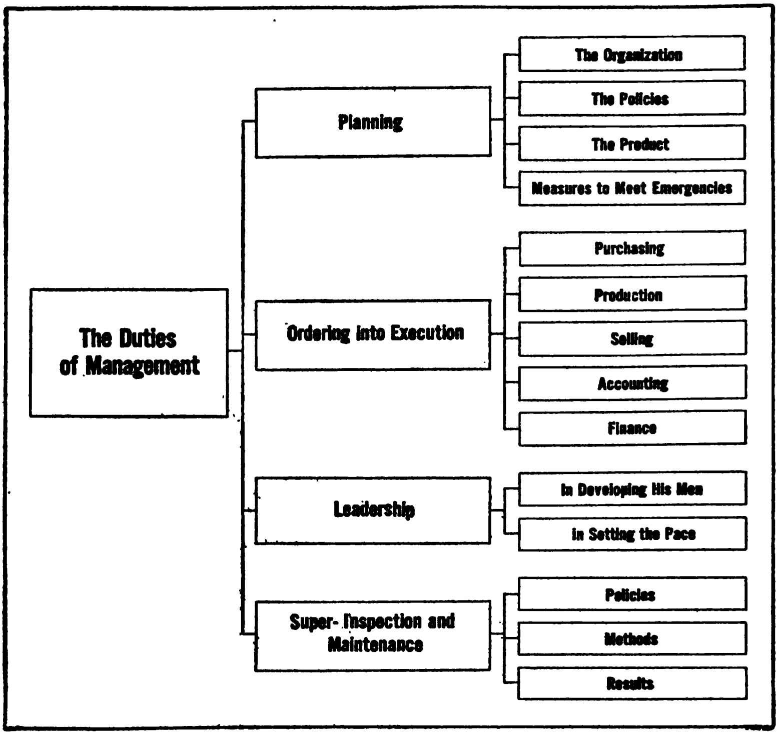


FIGURE XXVI: "Size up your job" is an instruction which the manager even more than the subordinate needs to apply. The manager is the one man in the concern who may have full knowledge and exercise full power. This analysis is designed to give a perspective upon the duties for which the manager must, therefore, be responsible

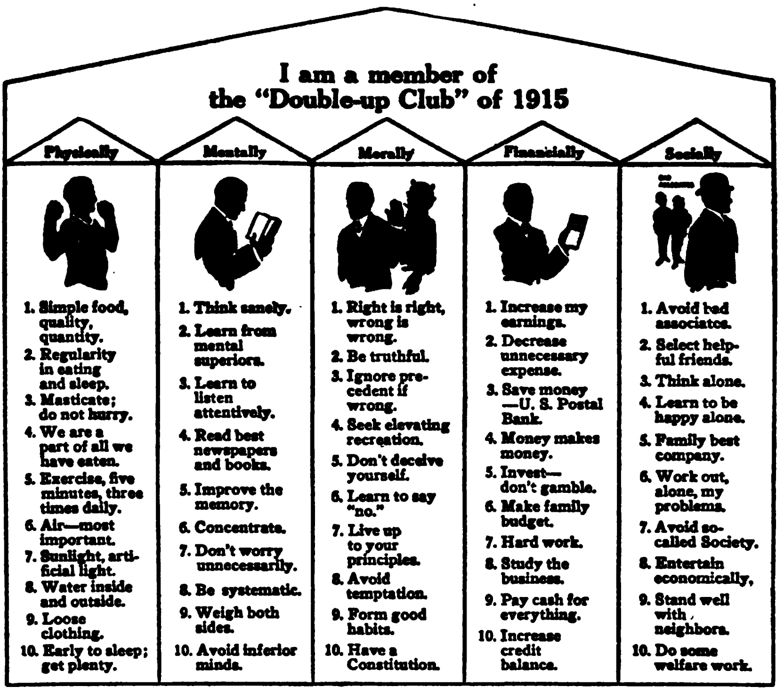
Back of this loss of personal efficiency is usually some mistaken idea which the executive has allowed to color his thinking —a lack of progressiveness, an undue fondness for some sideline which he has allowed to absorb energies that rightly belong to the main show. Or more likely, perhaps, the executive has stuck too close to his business, has not kept himself in touch with the outside influences among which his enterprise functions, has even neglected to maintain his physical condition and so has "gone stale."

WHAT THE MANAGER MEANS TO HIS ORGANIZATION—AS CHIEF OF STAFF HE TRANSLATES PLANS INTO ACTION

THE same solicitude with which an army protects its general, or a team values its trainer, the manager needs to give his own powers. If he is the chief administrator, he is also the chief of staff—the one officer of the company who both plans and executes. He constantly needs the fighting courage to put through hard campaigns; and also as chief of staff, he must keep intensely alive his creative and planning powers. As it is said of successful artists, he must always be his own keenest critic. His organization reflects his best and worst qualities; he must keep himself sensitive to its revelations. He should strive continually for fresh and clear perceptions, a mind well informed on outside developments and a body in perfect trim (Figure XXVI).

Rigid adherence to the factory schedule may be essential for shop hands, the clerical force and all those who give so many hours daily to handling work which has been adjusted to that schedule. To exact time-service from purely staff officers, however, is a different matter. Freedom of thought and action, not a mechanical routine; results, not hours, count in the work of planning. One of the most successful efficiency men and managers in this country tells his staff men never to appear on the job unless feeling fit, and if during the day their interest flags, to find some good excuse for leaving without delay. "Go away somewhere," is this manager's counsel; "take a run down to the seashore or go for a long tramp; do something that will rest and refresh you mentally. Come back when you feel your enthusiasm again on tap."

If it is well for the temporary chief of staff to follow this rule, how much more important is it that the manager himself, the permanent chief who must last indefinitely on the job, should do so. So let him standardize the routine as far as common sense permits, but let him keep himself free from subservience to any standard save personal efficiency. If this means coming late and going early, if it means an afternoon off now and then for golf, yachting, base ball or motoring, let it be so. If it means reaching out across the world for ideas and renewed enthusiasm—an extended trip once every year or two, attendance now and then at a convention, or inspection of other factories and offices, his own business should be so arranged that he can go freely.



I am a member of
the "Double-up Club" of 1915

Physically

1. Simple food, quality, quantity.
2. Regularity in eating and sleep.
3. Masticate; do not hurry.
4. We are a part of all we have eaten.
5. Exercise, five minutes, three times daily.
6. Air—most important.
7. Sunlight, artificial light.
8. Water inside and outside.
9. Loose clothing.
10. Early to sleep; get plenty.

Mentally

1. Think sanely.
2. Learn from mental superiors.
3. Learn to listen attentively.
4. Read best newspapers and books.
5. Improve the memory.
6. Concentrate.
7. Don't worry unnecessarily.
8. Be systematic.
9. Weigh both sides.
10. Avoid inferior minds.

Morally

1. Right is right, wrong is wrong.
2. Be truthful.
3. Ignore precedent if wrong.
4. Seek elevating recreation.
5. Don't deceive yourself.
6. Learn to say "no."
7. Live up to your principles.
8. Avoid temptation.
9. Form good habits.
10. Have a Constitution.

Financially

1. Increase my earnings.
2. Decrease unnecessary expense.
3. Save money —U. S. Postal Bank.
4. Money makes money.
5. Invest— don't gamble.
6. Make family budget.
7. Hard work.
8. Study the business.
9. Pay cash for everything.
10. Increase credit balance.

Socially

1. Avoid bad associates.
2. Select helpful friends.
3. Think alone.
4. Learn to be happy alone.
5. Family best company.
6. Work out, alone, my problems.
7. Avoid so-called Society.
8. Entertain economically,
9. Stand well with neighbors.
10. Do some welfare work.

FIGURE XXVII: Personal efficiency is expressed persuasively in all its bearings in the National Cash Register booklet from which this chart is reproduced. The manager who has learned how to maintain his own efficiency is almost sure to extend the same doctrines to his force

If he cannot get away, he may well feel that the proper mechanism of direction and control is not yet his. If going would leave the organization without some one authorized and qualified to handle any minor emergency that might come up in his ab-

Requisites for Life and Health

1 Air	2 Food	3 Water	4 Light	5 Rest and Exercise
Clean air night and day Air, once breathed, is unclean Crowded rooms and theaters spread colds Colds are catching Deep breathing prolongs life Sleep outdoors if possible One-third of life spent in bed – have windows large Bedroom windows wide open winter and summer Nature's best tonic The only blood purifier	Your servant not your master Fuel for your engine Buy it wisely Cook it well Crush it fine Enough but not too much Hunger—the best spice The simpler the better Every food affects the whole body There is no "brain food" Beware of fads	Inside and outside daily Warm baths for cleanliness Cold showers for "bracers" Two million sweat glands 1½ pints eliminated by the skin daily Clean skin lessens work of liver and kidneys Cool baths increase resistance to disease Teach every child to swim	Sunlight Brings sunshine within the body Destroys germs Dispels the "blues" Faded carpets better than faded cheeks Nature's greatest life-saver Children and plants die without it Light and disease are always enemies "The fountain of energy"	REST Mental and physical The reward of work well done Relax the mind and body daily The resting body repairs quickly Prolongs life EXERCISE For health, not for strength Sends clean blood to brain Eliminates poisons Necessary for good brain work Avoid excess

FIGURE XXVIII: Another chart from one of the booklets issued in President Patterson's personal efficiency campaign. Opportunities which the manager has to know the value of and means to personal efficiency are thus extended to those subordinates who have less access to professional advice

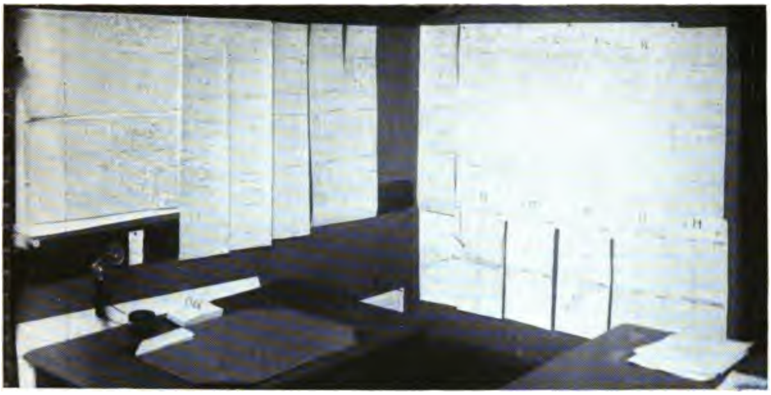
sence, such as handling unusual orders or serious complaints, then the executive has failed to observe the principles of understudies and standard methods.

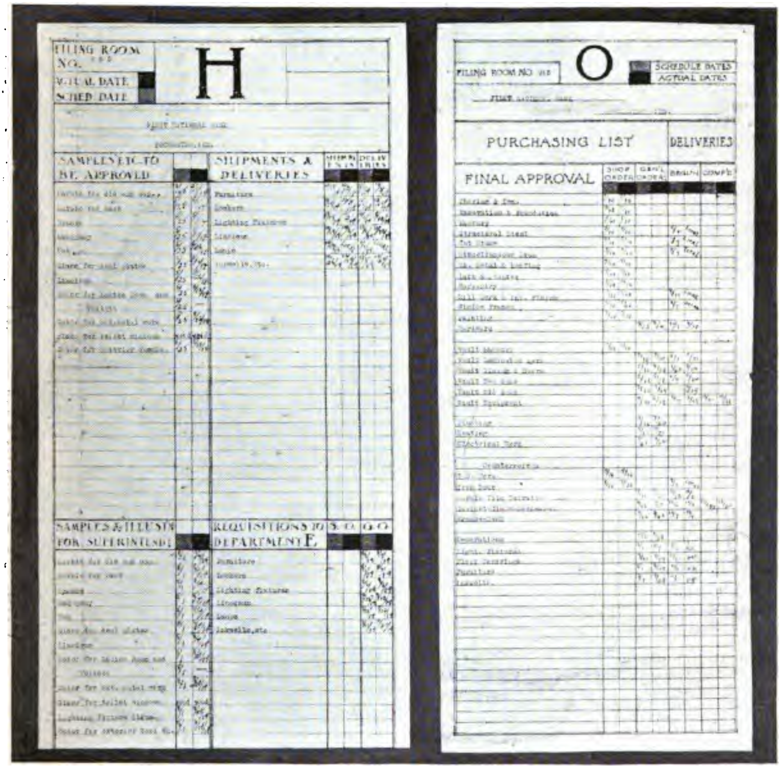
One manager in fact makes it a point to leave at unexpected and unannounced times "just to give the boys a chance," as he puts it. "While I am around," he says, "it is almost impossible, manage as I may, to stop them from deferring to my judgment. My presence literally impedes their growth. When I am away, they are thrown on their own resources, and that's what develops men. I purposely go without notice and return the same way. They do not know what moment my responsibilities may be thrown on them and as a consequence, they keep themselves prepared. Because I may return at any time, they are also fairly certain to 'make hay' in my absence. It may seem odd, but I always feel that they have accomplished more in my absence than when I am around."

When such a manager can no longer hold the pace he has set, he finds it easy to withdraw without taking the main prop from under his business. Some of the ablest executives in industry have recently retired to the "chairmanship of the board," proving their qualities of leadership once for all by the presence of an understudy able to take their place in the president's chair. This course assures the business of the chief's remaining strength without hampering it with his weaknesses. Relieved of his arduous executive duties he can still give his best hours and clearest thought to the organization he has built up. Removed from detail, and reinforced against errors of judgment by the advice of his board, he is more than ever the leader as to plans for the future and critical review of day-to-day results.

By such organization plans and personal methods, the manager uses responsibility under the principle of superinspection to inspire his men toward breaking records he himself may have set. And in the freedom thus gained, he reaches out for still greater initiative and inspiration.

In this, as in everything, however, the manager should work with a clearly defined purpose. To keep irregular hours merely for pleasure—to divide his own duties among his men simply to get away from his business—to gain the reputation of being the one non-producer in the plant—introduces a stumbling block to content in the force. The manager needs to prove to his men that he makes the best use of his time, regardless of where he





FILING ROOM NO.

ACTUAL DATE

SCHED. DATE

H

SAMPLES ETC. TO BE APPROVED

SHIPMENTS & DELIVERIES

SAMPLES & ILLUS'N FOR SUPERINTEND'T

REQUISITIONS TO DEPARTMENT E

S. O.

G. O.

FILING ROOM NO.

O

SCHEDULE DATES

ACTUAL DATES

PURCHASING LIST

DELIVERIES

FINAL APPROVAL

SHOP ORDER

GEN'L ORDER

BEGUN

COMP'D

A construction company, after each contract is laid out in general terms on the board previously shown (Page 128), subdivides the work and distributes these schedules to the operating departments. All department schedules are returned to the executive office three times a week in order that the management may check upon the progress of the work

The progress in the various construction projects mentioned on Page 145 is shown graphically by these charts. This record covers in an interesting and easily understood way all contracts received, preliminary and final approvals obtained, preliminary and final estimates made, work started and contracts completed. By consulting this record for a few minutes daily, the management keeps in close touch with production keeps his person. Back of his irregularity should be a fixed purpose to further the business in ways no one else can cover and to contribute personally the greatest total good to the establishment.

FREEDOM FROM DETAIL ENABLES THE MANAGER TO MEET HIS MEN HIS TRADE AND THE PUBLIC

THIS freedom of action, for example, will enable him to know his men better. In many businesses the manager is ignorant of the feelings and conversations that go on among the employees. What they are thinking about, how they regard the future of the business, where they see possibilities for it and what rewards will bring out the best in them are unknown to their chief, just as his breadth and sympathy are frequently unknown to them. Some managers have a natural knack of bridging this gap. They drop into a department now and then, set a new pace, prove a personal understanding of that detail of the work and link it in the minds of the men with the great purpose of the business. In this contact any shrewd manager will learn to see himself as his organization sees him and will feel spurred anew to make himself the real leader.

To lead he must inspire confidence, cause men to respect him and desire to emulate him. He must first of all be a Man; calm and self-possessed; clean, square, self-confident; sure of the good in all men but quick to rebuke trifling with principle; hopeful and resolute; slow to pass judgment but quick and decisive in action; as considerate of the rights of the gate keeper as of the superintendent. He must have, too, a philosophy of his business and logical habits of mind to meet his problems—the ability to disregard precedent, to see afresh and without personal bias, to take a problem to pieces, find where the trouble lies, how to correct it and put the new course into action step by step.

Such a leader, men follow even at a personal sacrifice. The influence of this type of manager permeates the business. Good men are drawn to him and show unsuspected abilities under his handling. His payroll is an asset in good will.

In the outside contacts, meanwhile, he must keep abreast of the times. No progressive manager any longer is contented with his own experience alone as a guide. Each seeks ideas constantly from other managers. The chamber of commerce, the weekly luncheon of managers in his own line, and the other associations that broaden men, are now his to enrich his own mind and round out his control.

In this way he will balance up his personal peculiarities and possess himself of the best in the methods of other managers. His business will rarely seem an irksome task, but will grow into an inspiring and absorbing service, handled with the self-confidence that comes with the helmsman's intuitive sense of the right move of the tiller to meet any circumstance.

X

FITTING THE FACTORY TO ITS TRADE

"WHAT are you going to do?" the general manager of an Indiana wood-working factory inquired of his factory superintendent early in August, 1914.

"I don't know yet. We still have some work ahead, but it looks like short hours at once and a shut-down soon," said the superintendent.

"I know what I should do if I were in your place," replied the general manager. "I should be out with the salesmen this afternoon."

The factory superintendent made the most of this suggestion. He went with one of the best salesmen, watched him rebuffed in most of the offices from which he was accustomed to take orders and soon was suggesting to him new types of prospect for wood products and assisting him to shape his bids to lines of work which the factory had never handled.

Those first few days, when competing concerns were stunned by the news of war in Europe, decided the future of this plant. New lines of wood-work were found, to handle which the factory was well equipped; lines, moreover, which promised larger markets than the regular product could ever have afforded. By recognizing his factory as a flexible machine and adapting it to new wants, the superintendent solved the problem of profit and loss.

Demand is the foundation of business—the current upon which the work of producing and distributing goods is borne. No manager can ever afford to get far from that fact. Demand can be aroused, stimulated, educated, swerved to some extent, but its deepest currents are full of changes and surprises which cannot be controlled and to which the factory must be adjusted. Otherwise the final objective of factory management—permanent returns on the investment—can be reached only by chance.

It has come to be a rule of averages that an industry knows three phases—(1) that of development, in which the capacity of the business to soak up capital, to a conservative, seems unlimited; (2) the speculative stage, during which the business gathers headway fast and pays returns for the lean years as well as the present; and (3) the stage where increased selling efforts meet with diminishing, or relatively less returns. Despite instances of a "tidy business" built up by the father and coming down to the son and the son's son on the same comfortable basis, this sequence is the rule. Beneath it, moreover, lies a philosophy.

A business is based on an idea. The founder has picked out a certain demand upon the part of the public and gradually shaped his organization to supply it. Once the mechanism of supply is perfected and in line with the demand, returns are favorable. Then success brings competitors. Through competition prices are cut to a narrow margin or none. The product, which in the beginning was perhaps a specialty, patented or otherwise, or a "special," built to order in every individual case, has become standardized and staple. The everyday demand, perhaps increasing parallel to the increase in population, monopolizes the attention of the management. No new ideas are injected into the enterprise. Currents shift, competitors with a new refinement come into favor and the business often "runs out."

HOW TRADE GROWS AWAY FROM PRODUCTS WHICH ONCE WERE POPULAR

SUCCESS accordingly depends upon keeping the business in a definite forward current of demand. It is not essential to be in the main current and supply the great mass of people with a necessity of life, such as flour or sugar, clothing, fuel or shelter. A side current may prove highly profitable—a specialty such as "Uneeda Biscuit," "Crystal Domino" sugar,

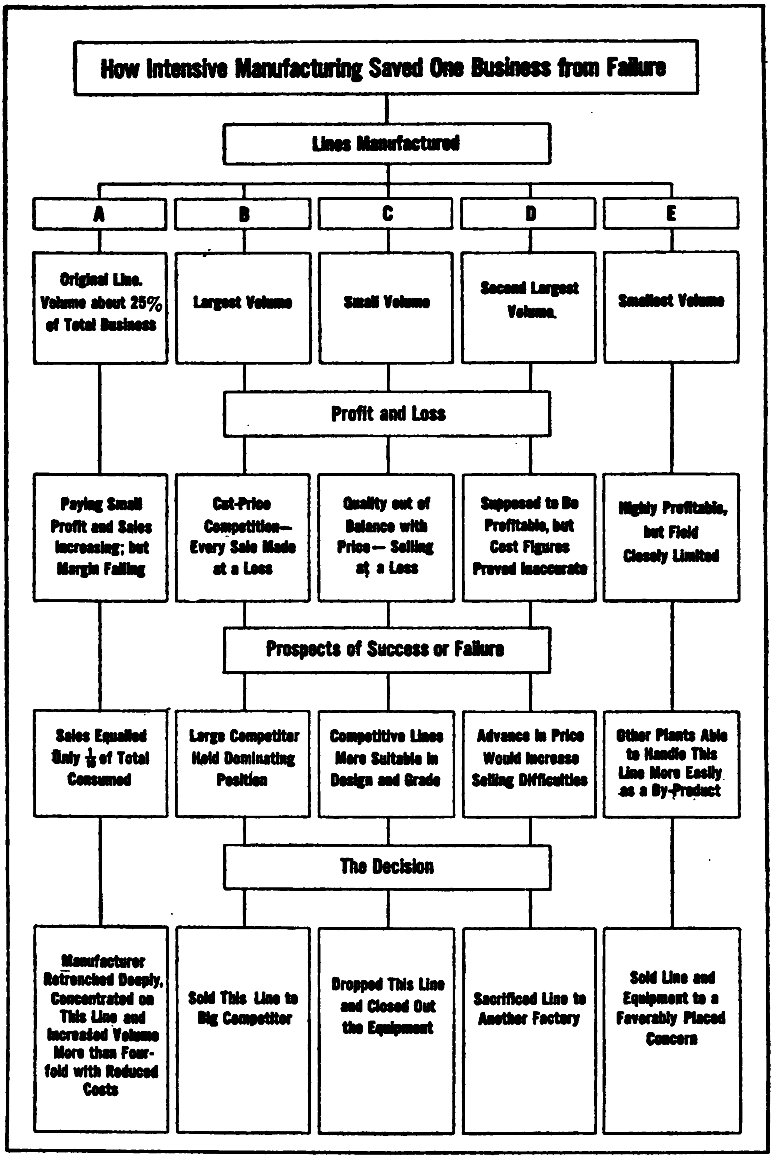

How Intensive Manufacturing Saved One Business from Failure
Lines Manufactured
A
B
C
D
E
Original Line. Volume about 25% of Total Business
Largest Volume
Small Volume
Second Largest Volume.
Smallest Volume
Profit and Loss
Paying Small Profit and Sales Increasing; but Margin Falling
Cut-Price Competition—Every Sale Made at a Loss
Quality out of Balance with Price—Selling at a Loss
Supposed to Be Profitable, but Cost Figures Proved Inaccurate
Highly Profitable, but Field Closely Limited
Prospects of Success or Failure
Sales Equalled Only 1/8 of Total Consumed
Large Competitor Held Dominating Position
Competitive Lines More Suitable in Design and Grade
Advance in Price Would Increase Selling Difficulties
Other Plants Able to Handle This Line More Easily as a By-Product
The Decision
Manufacturer Retrenched Deeply, Concentrated on This Line and Increased Volume More than Four-fold with Reduced Costs
Sold This Line to Big Competitor
Dropped This Line and Closed Out the Equipment
Sacrificed Line to Another Factory
Sold Line and Equipment to a Favorably Placed Concern

FIGURE XXIX: A factory which was facing failure was making five main lines—A, B, C, D, and E—in the relative volumes roughly indicated. How the manager examined the lines from the viewpoint of profit and loss, determined his prospects of success with each, and brought his factory into step with his most profitable trade, is here summarized

or "After Dinner Mints," instead of the staple flour or sugar. Instead of manufacturing such a staple as automobile-engine castings or bodies for various assembling concerns, the business may be catering to individual tastes in a narrow field, as does the maker of special automobile bodies and the merchant tailor. You may please the standardized taste of the masses, the special inclination of a certain class or the highly individual tastes of those who decline to be standardized.

Thoroughly to understand your own and the adjacent fields of demand, and the trend in each will usually indicate what the business and the factory behind it should do. To have this understanding and decide on this policy is nothing less than the first requisite of management—the one all-important job for the head of a business.

When competition in the staple line waxes hot, the manager may draw upon the peculiar advantages of his organization, and by cutting costs, excelling in quality and service, and reducing sales expense, may practically monopolize a certain part of the field. One manager who was putting out five lines found on investigation (Figure XXIX) that only one was paying a profit. By abandoning one and selling out three to competitors, he cleared for action on the profitable line and on it alone increased his sales total. If at a disadvantage in facilities, however, the manager should still consider that the organization he has built up is far more flexible than he probably realizes. Let him swerve it into a special line where by tests he finds a fresh demand and to which most of his investment can be adapted.

In this way the specialty splits off from the staple; the business in by-products, and the made-to-order trade further subdivide; the latter in turn grows into a staple and has its offshoots which afford success to the concerns following them. This division applies to both goods and service—both to the factory which processes shoes and the organization which makes and markets a service—the architect's office, the laboratory, the repair shop. Life constantly grows more complex, and demand more intricate, more specialized (Figure XXX). The public scale of wants is always increasing—its sense of what is proper always going up. The progressive manufacturer keeps always readjusting as a policy, maintaining his goods in line with his markets just as his maintenance men in the plant make their rounds to true up the line shafting.

How frequently this readjustment is to be made depends on the type of product. Catering to individual whims may be the business of the factory, on which its prices are based, or the manufacturing of a special may be inexcusable under a strict scheme of standardization such as that at the Willys-Overland plant. Between these two extremes are all the gradations of standard manufacture. The important thing is to make a con-

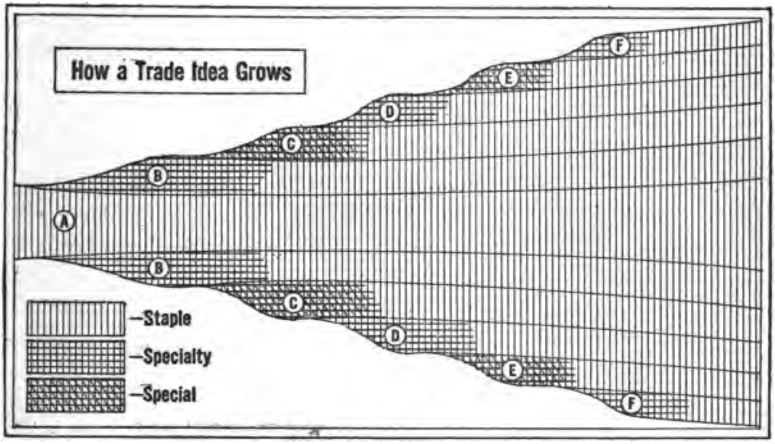


FIGURE XXX: Every average commodity has its experimental stage, when it is made to individual order; then its sharp curve of success, its slowing-down stage, when competition becomes close and processes standard, and, finally, its defensive stage, when improved products in the same field heavily attack the demand that supports it. The importance of these inevitable stages in the life of most products demands attention for them from the production, sales and advertising heads of every concern. A rough illustration of the typical development among cereal products is here given. Flour (represented by A), after many years of made-to-order milling, has become a staple product, produced by many mills in close competition on a narrow margin. A certain natural increase in demand was to be expected. Then specialty lines (as B-B, packaged and branded flour, and prepared cereals) developed. Because of their unique features, these specialties escaped the closer competition, paid better, and not only created a demand of their own, but invaded the field of the staple. As a trade was educated to these specialties, quantity production permitted processes to be standardized and invited competition, so that the lines tended to become staple. Special made-to-order bread and crackers (C-C) developed from these specialty ideas, more closely fitting the individual wants of smaller classes of consumers. As these specials became popular, however, they were marketed in competition by many professional bakers and became staple. Firms which wished to escape this competition then standardized and trade-marked their goods as specialties (D-D, an advertised brand of bread, and a brand of packaged soda crackers). Already the public has grown accustomed to these specialties, and competition has given them such distribution that they are accepted as staples. Other specials, meantime (E-E, fancy breads, crackers and confections), have developed to suit individual tastes, and permit the artists of the trade to exercise and profit by their individuality. As these articles were taken up by competition and became staple (rolls, ginger and fig wafers, etc., in bulk), enterprising manufacturers developed specialties (F-F) based upon them, which came on the market as boxed and branded ginger and fig wafers, etc. In every line this sort of subdivision and multiplication of wants is constantly to be expected by the manufacturer. Planning to keep in line with his trade is, therefore, one of his most important functions

scious policy of what you are doing, based upon an up-to-date knowledge of your field and your plant. Merely to standardize work and veto all changes because it costs money to alter patterns, dies, tools, instruction cards and selling methods is not a policy, but a stiffening of the factory's joints. It indicates old age and invites competitors to supersede you.

SETTING UP GAGES BY WHICH THIS DRIFT OF TRADE CAN BE OBSERVED

WHEN demand shows an ominous slackening—better yet, before the unfavorable trend of your trade has expressed itself in actual figures on your ledger, the manager should be studying and gaging the changes in the trade with all his acumen. As soon as he detects a new trend, readjustments are in order—readjustments in product or selling policies, or perhaps both.

To read these perplexing undercurrents in trade and to realign the factory and selling machinery to fit them calls out all the management qualities a business can command. No rules can be laid down. How managers have dealt resourcefully with such situations can, however, be studied.

Fundamental conditions sometimes tell the manager what he needs to know about the drift of trade. When other factories were busy constructing cars priced at five, six and seven thousand dollars, it was an intuition to Henry Ford that the man of modest income has the same inclination towards outdoors, speed and convenience as people of greater means, and that by evolving standard, low-cost production, he could develop a monopoly vein in the market for automobiles, to the extent of a truly enormous demand.

"Is my product right?" is the most frequent question the manufacturer asks himself during his first six months in business. At the start, his enterprise is indeed merely a process of turning out something and carrying it to customers, finding out what they think about it and further refining it. Within certain limits the testing and refining process should be kept up throughout the course of the business. In many concerns this is actually done.

Recently a large eastern corset company has established three "test" stores, in New York, Chicago and San Francisco. Skilled salesmen at these stores make special studies of both new and old lines in their dealings with customers. Through these men, the company hopes "to be able to ascertain the individual requirements of average women and without delay to make the necessary modifications in its wholesale lines." The management has also arranged for dealers the country over to contribute their trade notes to the investigation. With outposts of this sort at strategic points, the factory is assured of being among the first to learn of changes demanded by the trade.

Fashions is one of the most difficult of all problems of trade adjustment. "We hardly get a new line of garments into the stock-room," said one cloak maker, "before they are out of date and must be unloaded at a sacrifice." In the days of long stocks and once-a-season purchasing this condition did not exist. Dealers educated to thin stocks and frequent re-orders, however, have brought it to a focus. Garment manufacturers, working upon this problem in conjunction with leading retailers, have developed a method of gaging demand in advance. Test models of gowns and coats, especially ticketed to prevent their delivery, go on display at the beginning of the season and orders are scored for the various models. Quantity production is scheduled only for those items winning a heavy vote. Styles that are not right, moreover, come in for correction. Supply is tailored by repeated fittings upon demand under average conditions.

In a similar way, new tools, new food products and many other items are tested. Average towns are sometimes chosen in which different mixtures, different packages and different selling schemes are tested. But the principle is not limited to new products and is capable of great expansion. The rule is that demand, like materials, may to a certain extent be tested in advance of each re-investment in stock.

Advertising supplies many devices for thus gaging demand, by circular letter, by booklet, by the use of space in various mediums. For similar reasons, some concerns frequently call their field salesmen into conference with the management. The salesman, as the man who explains talking points to prospects and explains away the prospect's objections, is well fitted to speak on at least the negative side of demand. He may not know towards what the public is drifting, but he is almost certain to know from what it is drifting away, and perhaps why.

Complaint data, similarly, can be so organized as to give definite indications about the trend of demand. The complaints may pertain only to the packing of the product, or may point to defects in design, construction or material. An analysis of complaints by departments and under such headings as "Price," "Quality," "Service," and "Other Preference" insures the manager that he is not unconsciously drifting away from his trade. One manager handles every letter of complaint personally. "What we have done right I can forget about," he says; "but complaints involve our good will and show us where we are falling down. They point to the future."

HOW RESOURCEFUL MANAGERS HAVE REVISED PRODUCTION IN LINE WITH NEW WANTS

WHATEVER the manager reads as to the trend of his trade must be accepted unflinchingly. The ensuing readjustment to suit demand must be no less so. When the management of a bar fixtures factory saw state after state shifting into the "dry" column, they first turned the genius of their business into the channel of manufacturing game tables for home use and by brilliant selling tactics developed this broad, stable market; then announced that they would absolutely discontinue the manufacture of bar fixtures. Readjustment of production in this case meant discontinuance of an important staple line. But the prior development of another even broader market robbed the change of its peril.

When the Macbeth glass works found the oil lamp giving way to gas and electric lights, in the latter of which the "chimney" was a part of the patented manufacture, it realigned its production forces to grow into the field of gas and electric shades and fixtures, as rapidly as the new conveniences came into wider use. Manufacturers of coal stoves found in the same new forces a drift of demand which has kept them re-shaping their product season after season. Gas and electric stoves for both cooking and heating now form a large volume of the trade. Gas-and-coal stoves also have found a market, in according heat in cold weather and quick, cool convenience in summer. As coal was done away with, the chance for a white stove appeared, and the factory became almost as much of an enameling plant as a foundry and machine shop.

How plants have shifted from bicycle making to the manufacture of automobiles and from both wagons and automobiles to motor trucks indicates resourcefulness under similar developments in demand. War-time changes for the manufacture of military textiles, ammunition and the accessories to its manufacture instance the same principle. One plant recently found a paying side-line in the manufacture of small tools special in details, but in the rough capable of being standardized and carried in stock.

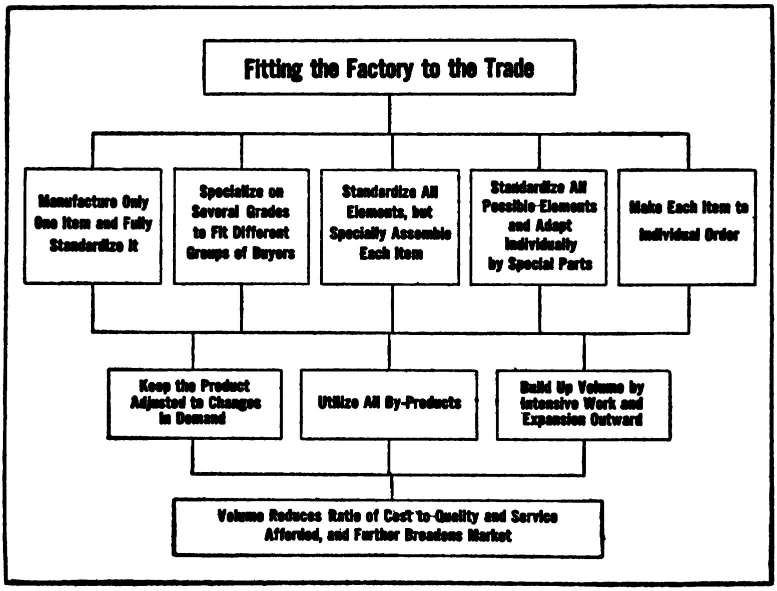

Fitting the Factory to the Trade
Manufacture Only One Item and Fully Standardize It
Specialize on Several Grades to Fit Different Groups of Buyers
Standardize All Elements, but Specially Assemble Each Item
Standardize All Possible Elements and Adapt Individually by Special Parts
Make Each Item to Individual Order
Keep the Product Adjusted to Changes in Demand
Utilize All By-Products
Build Up Volume by Intensive Work and Expansion Outward
Volume Reduces Ratio of Cost to Quality and Service Afforded, and Further Broadens Market

FIGURE XXXI: To standardize the product is one of the great tendencies in industry. Even if this is not best, the manager should have clearly in mind just what service his factory is giving. The five main manufacturing propositions are here indicated, together with three rules that apply to all, and the one main principle which underlies success

The transition of the Gray-Davis plant from the manufacture chiefly of marine engines to the business of making starters for automobiles shows still again that an organization is flexible and that for the demand which is becoming relatively unimportant a new and greater demand can usually be found if the management is sufficiently sensitive to men's needs.

While the great trend of the times is toward standard manufacture of a single product or part, sometimes a concern goes back because it is selling only part of its product. Almost every industry can do in a smaller way what the packing industry has done in the marketing of by-products. The same materials that poison the air in the Appalachian coke districts make up products for which a steady demand turns to the Cement-Solvay Company and other progressive coke and gas manufactories (Figure XXXI).

If profits are not right, therefore, your study of demand needs to be carried on in conjunction with a scrutiny of whatever your factory wastes. Find the connection between the scrap pile and demand. Look through the consumer's eyes at the resources—power, raw materials, labor, capacity—which you are not using in full. Find what product they would make, for which a market can be found.

Whether it is a whim of the public or a persisting vein of demand which you are working is an alternative the manager cannot afford to forget. It is a healthy instinct that leads the management to instruct its sales manager, and the sales manager to instruct his men, to argue against "specials." Often it is only education on the standard goods that the buyer needs. The manager with the proper perspective upon both production and sales will to a certain extent penalize orders for non-standard goods, or, in other words, pay a higher commission on regular orders. There is a point, however, beyond which it is not well to push this plan. The salesman's resistance will soon develop the real strength of the demand. If the demand is there, profit lies in line with it. As each specialty is worked out, the price is set to profit by the extra value which the variation gives the product in the eyes of the buyer—the "consumer surplus" which a certain class of trade is ready to pay for something more exactly fitted to its needs.

Machine tool building illustrates this point. As manufacturing has become more specialized and standardized on a quantity basis, a strong current has set in against stock machine tools.

The investment in a special machine, so equipment experts have proved, is usually trivial compared with the producing value of a machine exactly fitted to the needs of any concern employed on steady output of standard character. The maker who is persistent in his policy to produce only standard models finds his market narrowing.

In the face of this problem of trade, one progressive builder has made a compromise in his production methods which retains much of the efficiency of stock production, yet gives almost perfect adaptation to peculiar needs. He builds his machine standard up to a certain point. This gives him a good manufacturing proposition for almost the entire plant. The variations he isolates in one department. His machines are assembled and stored in units so that deliveries can be made quickly. By this method he largely secures the advantages of standard production, yet keeps in line with special requirements in that part of the machine tool field where future dividends lie.

DEALING WITH THE INTRICATE AND PUZZLING PROBLEMS OF DEMAND CREATION AND SUPPLY

DEMAND—the wants of the public—is by no means a simple problem or one easily understood. What the public wants at one time, at another it has no use for; the manufacturer's judgment is taxed to the utmost to know just when to announce a new line. Some products meet full-grown wants; others, wants not yet developed; still others, genuine wants which yet the customer will deny. Sometimes the factory goes on half time because the machinery of selling is clumsy and forces the customer to use up too much energy in the mere act of buying. At other times the advertising campaign must educate the trade for months or years before they recognize that the product is desirable to the extent of a permanent demand.

These are questions of selling policy with which the manager as well as the sales manager should be familiar. As a production problem, however, they concern him only so far: that changes in the product must not be made when changes or greater persistency in selling methods are the true need of the business.

Where a campaign of education is required, "catching the prospect young" is a method full of promise for the future of a business. The breakfast-food manufacturer, the makers of clothing, soaps, toilet accessories and tobacco products follow this method in overcoming the set habits of older people. Children trained to the new product will often bring older people into line and, further, may be counted upon as steady customers in later life.

Spreading the burden of such an educational campaign over the entire industry by means of a trade association has been done successfully in a few instances. Educational advertising involves large outlay and gives returns which it is almost impossible for one concern to concentrate. In one industry where trade conditions were demoralized and the manufacturers were at the mercy of buyers as regards prices, special work and free engineering service, an association has been formed which is so re-adjusting matters that the public can profitably be educated to the use of a highly desirable product and the product can be furnished in increasing quantities at a reasonable profit.

KINKS IN THE LINE OF DISTRIBUTION THAT HAVE FORCED FACTORIES TO SHUT DOWN OR REORGANIZE

SOMETIMES the problem of bringing the factory and the trade into accord is perplexing, the evidence elusive. All that can be said offhand is that the business seems not to gain. Thousands of dollars may wisely be spent in diagnosis work before the factory and the office departments can again work in well adjusted harmony with the trade. In such cases, business men with the new viewpoint take nothing for granted. They approach the problem as if it were entirely new, and challenge axioms of the trade upon which business has been done successfully for half a century. They analyze the problem into its elements, assemble the facts of each one, eliminate by graphs, charts and plan boards the details that cloud the judgment and thus approach a decision on which a successful future can be based.

Looking behind results for the hidden causes, they often learn that unsatisfactory sales are due, not to short crops or industrial slackness, but to fundamental changes in marketing conditions or consumer demand which have been growing up over a score of years. Old channels of distribution, they discover, have been broken down in many lines. The jobbing house has been eliminated as a factor in many territories, while in other fields, for other products, the wholesale units have been multiplied and their individual size reduced. The consumer's demand for national trade-marked package goods may have replaced the wholesaler's demand for bulk goods which he could market under his own name. The demand from a certain class for a product at a certain price may be so far satisfied that the business is on a renewal basis only and another grade of the same article at a lower price may be necessary in order to broaden out the demand into an assured future (Figure XXXII). Or the demand, it may be found, has almost vanished in a field which was formerly rich.

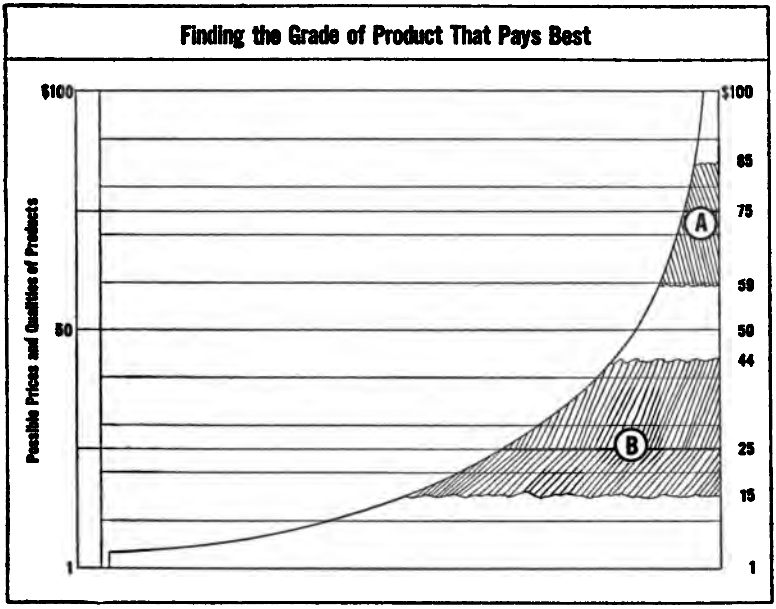


FIGURE XXXII: How many grades of product to make and at what prices, in order to strike the richest veins of demand, is a manufacturing problem of importance. In this sketch the curved line suggests how prospects become more numerous for a less expensive commodity. The decision indicated is to market two grades, "A" at $75, and "B" at $25. If a competing article is priced at $50, these two grades would perhaps have a chance of drawing trade as indicated by the shaded portions, including buyers who prefer higher priced articles of higher grade, and others who prefer more economical purchases. Even if the value suits the price in both cases, the further the prospect must be argued out of his original desire, the greater the selling effort necessary

After gathering and classifying his facts, the manager frequently discovers that to maintain his accustomed volume or expand sufficiently to insure healthy conditions in the organization, he must transfer his attention to other groups or classes of consumers, develop new uses for his erstwhile staple goods or even change over to the manufacture, perhaps, of allied lines. Occasionally, searching inquiry uncovers a general loss of confidence due to lowered ideals or negligence in the handling of orders, wholly unknown to the head of a business.

At times, the slump in trade is a natural reaction of the public against being pampered. The concern which takes value without truly benefiting its customers is either fooling itself or its trade. And in either case, the reaction can be looked for. If, on the other hand, the manager believes in the best in human nature, and founds his enterprise on true wants, to "come back" after a slump is likely to be only a matter of correcting his detail methods.

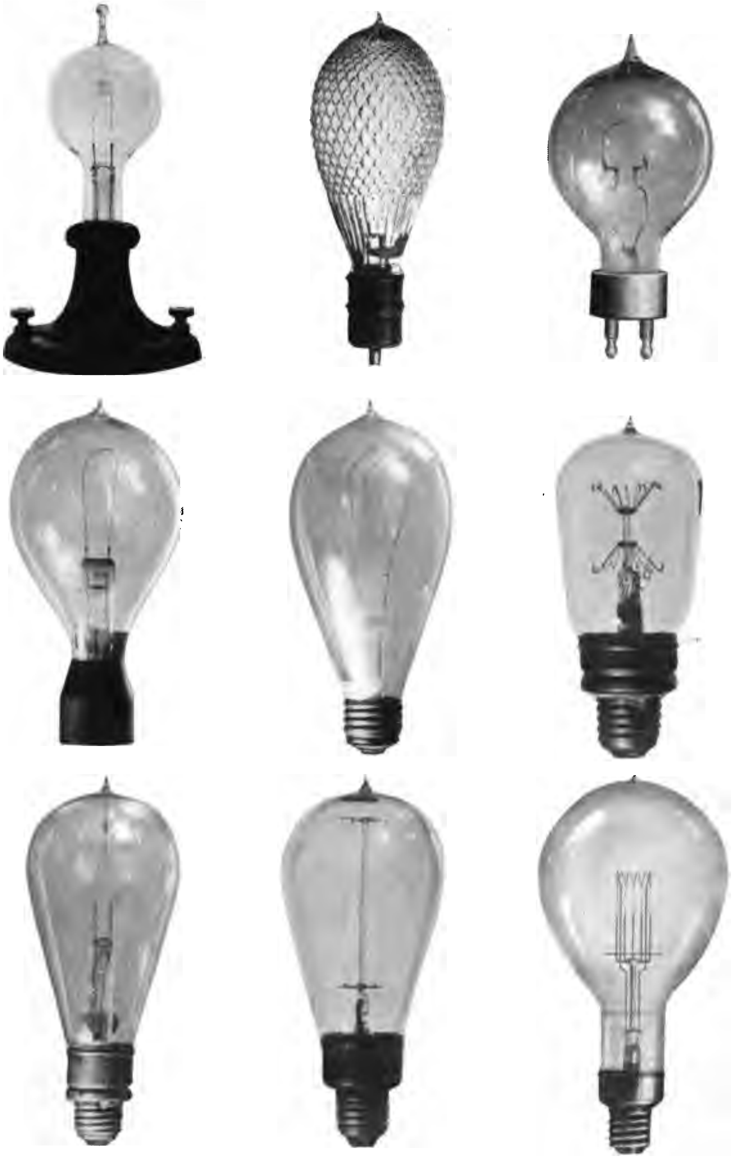
HOW A PIONEER BUSINESS CHALLENGED FAILING TRADE AND SECURED A TRUE IMPRESS OF DEMAND

HOW conditions may be analyzed and the facts thus sifted may be utilized is illustrated by the recent experience of one great industry which had developed a blind side in its outlook on demand. The momentum gathered in half a century carried it on at a moderate rate. With general slackness in the whole industry, the company, it was agreed, was "holding its own."

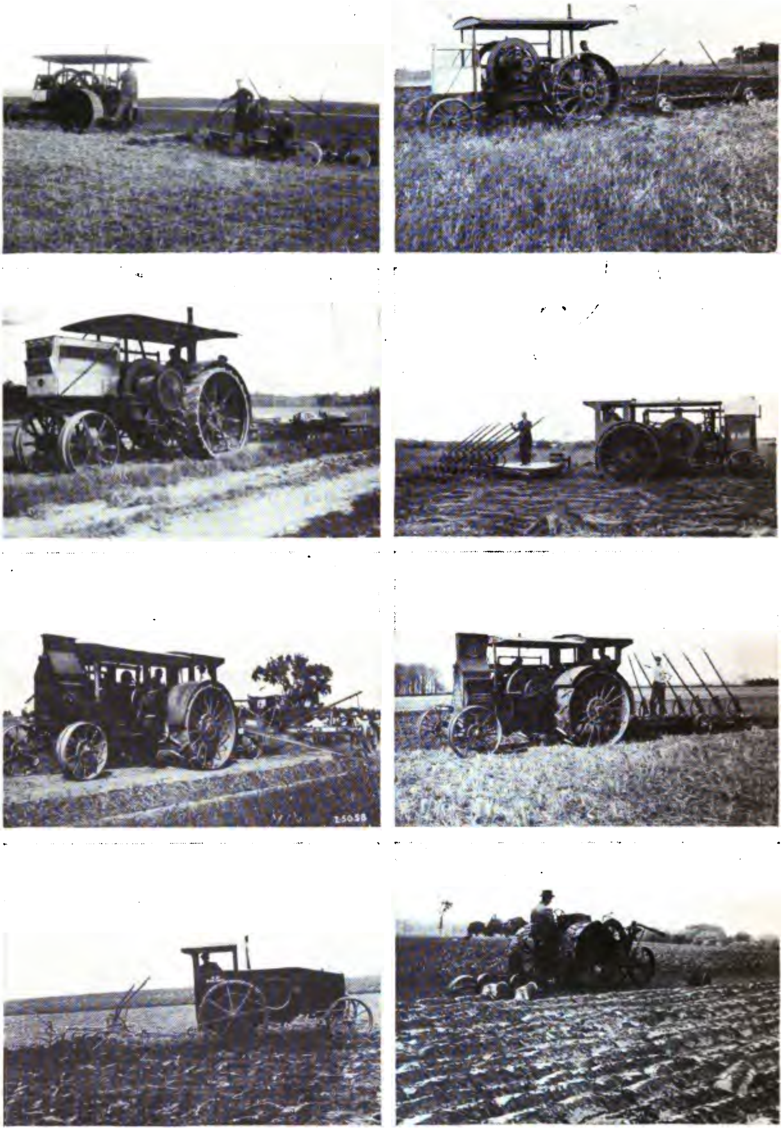
The president, however, had noticed various indications which he felt to be more than symptoms of a temporary stagnation. Sluggishness had given way to a decided downward movement in the sales by territories. The whole trade seemed sick.

Called into council by the president, the directors made light of the situation. At each succeeding meeting, however, as they faced the accumulating evidence of lost ground, they began to share his doubts. They were unable to lay finger on the reasons for the recession and their confidence in their own judgment weakened. They felt the adverse undercurrent, but lacked definite information either to reassure them or to confirm their fears.

Finally, the president brought matters to a focus.



How a product must be refined to fit its trade is typified in the electric lamp. The bulb with the wooden base is a replica of Edison's first successful lamp. Following it are an early type of carbon filament, a carbonized silk filament, bamboo filament, standard carbon, tantalum filament, and, below, two tungsten filaments, and an improved gas-filled lamp



Fitting product to demand is further illustrated by these I. H. C. tractors. One of the first types (1908), was the 15-horsepower friction drive, (left, top). The next developments were the 20-horsepower gear drive, the 45-horsepower in 1912, enlarged (left, bottom) to 60 horsepower in 1914, the 30-horse-power (1914), the enclosed 25-horsepower, and the "8-16" (1915)

"It's time," he said, "to stop this traveling around in circles. We've got to quit guessing and go after the facts. We need a thorough investigation into all the conditions surrounding our business and the tendencies which seem to be turning the trade upside down."

One of the directors objected. Hadn't the auditor smothered them with figures showing forty different conditions which, in the end, turned out to be negligible so far as their influence on sales went?

"Yes," the president agreed, "and that is why we are thinking in circles. We have lived too close to this business, and fed ourselves too much on mere office statistics. We need perspective. We need to see this business in relation to other lines of trade and general consumer conditions. We have been explaining the fluctuations of our trade by all kinds of rough-and-ready reasons —the effect of consolidations, tariff tinkering, the political situation and so on. But we haven't one shred of scientific fact to back up our explanations.

"We have got to dig into this thing hard and deep. There are several vital things we do not know about this business. We know who our jobbers are and the names of our larger dealers. We write to many of them every day and our salesmen visit them regularly. But we don't know who buys our products for use or with what kind of men and women they must make good.

"Years ago we put our trade in the hands of the jobbers. Retailing has changed but we don't know how it has changed or how the changes have affected our products. Consumer demand has changed: we need to know why and how. I propose, therefore, that we make a broad, thorough, analytical investigation into all these things and try to reduce the information to figures, charts and reports which we all can understand. Then we'll be in some sort of shape to save the business."

The work began next day. First a conference of all the manufacturing executives was called. In company with the president, they sized up the production situation from every angle. They examined the goods from the viewpoints of salability, value, efficiency, safety in use. But a searching analysis of trade reports, salesmen's complaints, the results of technical investigation and comparative tests established nothing except that the

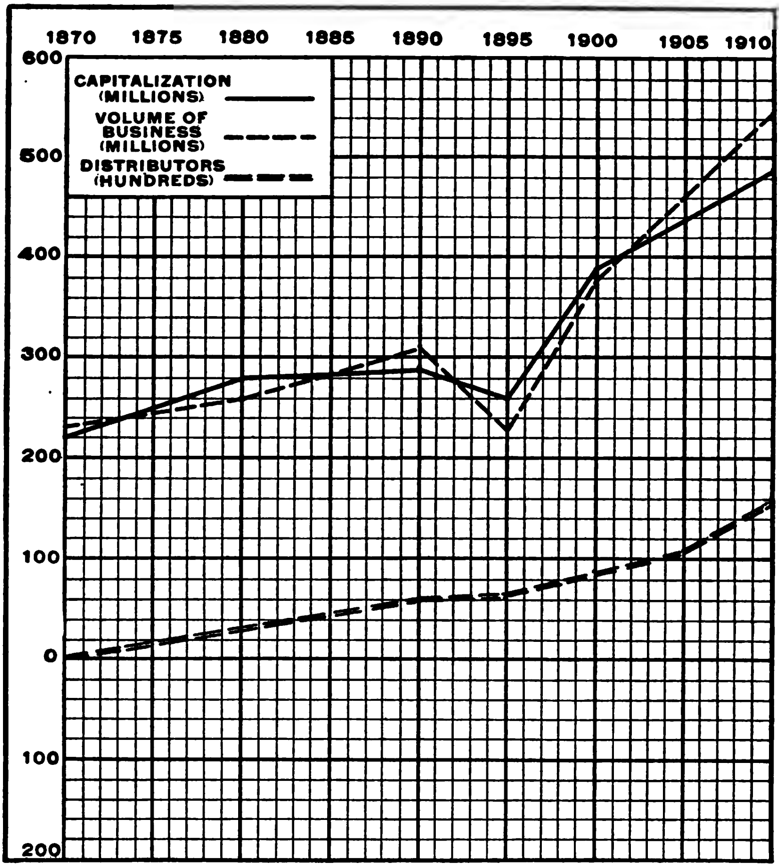


FIGURE XXXIII: The close relation maintained between the total capitalization and the volume of output in the entire industry is demonstrated by this "graph." As explained in the text, it covers the operations of the six leading manufacturers only. By comparison with a twin chart of the company's business, the relatively greater prosperity of the latter was made clear

goods were sound. Then followed a series of conferences on the quality and efficiency of the products as compared with competing lines. Every consumer's complaint received in ten years was gone over in detail. But no flaw in the sales value of the goods developed. Wherever the sick nerve was, it could not be found in the production methods or the work of the factory.

Interest centered next on the sales organization and the fundamental selling situation. A study of the whole industry was first

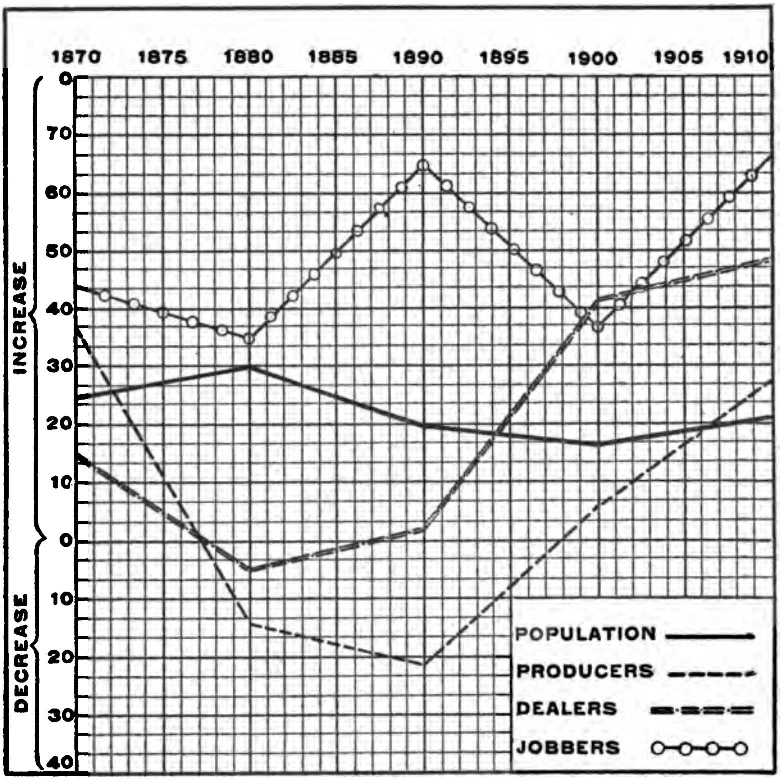


FIGURE XXXIV: Forty years of facts in an important industry are here reduced to a graphic record which helped to show the factory how it had grown away from its trade. The fluctuating rates of increase in the number of manufacturers, jobbers and dealers is compared with the relatively steady rate of increase in population. The striking fact brought out by the chart is the great relative increase in the number of wholesale houses

made. Graphic charts presented the volume of business of the six leading companies. They pointed back forty years. Getting the sales figures of two of these companies was easy; the other three guarded their statistics jealously, but sufficient data were secured to make the final estimate one very close to the actual figures. This sales chart showed conclusively that there had been no decrease in output which other firms had not felt more keenly; while the ratio of increase was always greater for the home company than for the other concerns. In a word, not one firm, but the whole industry, was suffering the same sickness, whatever that might be.

For the moment, therefore, the investigation did not take up the individual efficiency of the sales staff and organization. Instead, it followed the lead pointed by the sales chart for the whole industry, and tackled the broader questions of the consumer's attitude towards the line, his need of such products and the general distributive situation. The fundamental problem of business—to secure a matrix of demand into which the supply might be fitted—was before them.

Here a careful investigation was necessary. The information likely to be found useful and suggestive was classified and the inquiry was pushed in all parts of the country. Six weeks later this information, tabulated and reduced to graphic charts, was laid before the executive board. It supplied clear and unmistakable reasons for the condition which they had felt but had failed to analyze, and offered data comparing the current trend of the industry with the movement in other lines.

In a nut-shell, the peculiar situation in the trade hinged on three separate developments: The first and by far the most important was the movement of population to the cities and the decrease of wild and uncultivated land. When a man moved in from the country to take a job in a store or factory, his use of the company's products virtually ceased.

The second development was the passing of control of distribution from the hands of the jobbers in the central markets and the multiplication of smaller wholesale houses to which the carrying and pushing of the company's line might be a matter of only casual interest. If the goods were called for, they would be supplied; but specific demand by consumers was the only reason for stocking and handling them which these new houses recognized as imperative.

The third transformation which had taken place was the entry of the department store and the mail order house into a field which had previously been controlled exclusively by dominant specialty dealers in every town of any size throughout the country.

To arrive at these conclusions thirty or forty graphic charts (Figures XXXIII to XXXIV) were compiled, covering among others the following facts and relations, shown by decades since 1870.

Number of distributors compared with number of manufacturers.

Number of retail outlets compared with each of three grades of jobbers and wholesalers.

Number of manufacturing workers compared with general total of distributors.

Rate of increase of volume of trade compared with increase in distributors.

Fluctuations of retail and wholesale profits.

Graphic tabulation of the length of time present jobbing firms have existed.

Volume of trade contrasted with general bank clearings, building activity, and per capita wealth.

Number of retail outlets; also number of jobbers to each thousand of population.

Amount of purchase by individual consumers.

Ratio of population movement toward cities compared with volume of trade ratio by localities.

Efficiency of salesmen as shown by calls.

Ratio of increase in distributors contrasted with the increases in other lines of trade.

Per capita consumption of the line of goods compared with the other lines of goods.

Capitalization in manufacturing compared with volume of trade, and ratio of increase in distributors.

The per capita consumption of the whole industry's products was a long and tedious job. In some territories the books of the leading wholesalers supplied the necessary information, eked out by estimates covering the volume of those jobbers who were not in sympathy with the purposes of the inquiry. In many cases it was necessary to draft local correspondents, banks and commercial agencies into the investigation.

WHAT THE INVESTIGATION SHOWED AND HOW THE BUSINESS AGAIN PUT ITSELF IN LINE WITH DEMAND

IT was not easy, from this somewhat formidable mass of matter to arrive at conclusions which would give a real insight into conditions. The figures on which the graphic charts were based would have discouraged and possibly baffled the executives, whereas the graphic charts brought all the information into coherent and recognizable relation. One by one the conclusions projected themselves out of the information gathered and satisfied even the most skeptical. Instead of guessing that the increasing tendency of the population was toward the city, and that the gradual elimination of forests and other uninhabited places was one big factor in reducing the consumption of the company's goods, the graphic charts not only corroborated this theory completely, but *measured* the exact relation between cause and effect.

On the main issues all agreed that the evidence of the charts was conclusive. The falling off in sales for the whole industry was due to the changed attitude of the consumer, coupled with the general indifference of the wholesaler and the lack of an incentive to cooperation on the part of the dealer.

This conclusion indicated as plainly as a "graph" itself what would have to be done to restore sales vigor and efficiency. Constructive educational work was necessary to revive the interest of the urban consumer. His changed situation had to be taken into consideration in framing the new appeal. New uses had to be discovered and pointed out. Many of the products would need to be designed anew and adapted to this changed physical situation.

Consumer wants, desires and opportunities to use the company's goods furnished the key to the situation. The wholesaler's indifference would yield to the revival of consumer demand and the right kind of selling effort. Where he failed to show the proper interest in the new sales plans, the company had a second string to its bow. It could either transfer the account to another jobber more amenable to influence or deal with its retailers direct.

The advertising manager, in touch for the first time with the environment and needs of consumers, was able to plan a campaign which would turn the attention of these forgetful buyers again to the company's products. Knowing where the various classes were grouped, he was able to choose mediums and vary appeals so that each dollar spent earned its right proportion of inquiries and orders. His campaign directed at retail dealers had the same virtue of shooting at a mark made visible by the light of exact knowledge. The sales manager, in his turn, found the board of directors a unit in backing the vigorous program he laid out for handling the jobbers and coaxing his dealers into line with the new program of cooperation. The works' superintendent, who had been urging an addition for two years, after studying the "graphs," acquiesced in the board's decision that for three years every surplus dollar was worth double its factory value if expended in the selling field. Meantime the work of the factory was in a measure revolutionized. Old models were discarded; new models designed and scheduled; tests made of pattern articles, and quantities put through in accordance with the results. The factory which had been making what its trade could use only at a disadvantage veered around and under positive information took the center of the stream of demand, where resistance is at a minimum.

This particular business has not yet solved all of its problems. It has, however, made a fresh start on a well-mapped road, with an organization full of confidence in its policies and its managers. It is meeting its trade problems and tendencies intelligently and is gathering strength and experience in the new program and methods, while its rival companies, without definite knowledge on which to base their efforts, are piling blind enthusiasm into a widening breach.

XI

EMERGENCIES—THE CRUCIAL TEST

"ISN'T it true?" one of the machinists at the Link-Belt works inquired point-blank of President Piez, who had called a conference in the face of a threatened strike, "that we really earn our day's pay in only two hours?" Piez saw that the man was sincere; that he expressed the thoughts of many workmen when he suggested that the profits of the business were equal to three and a half times the payroll. Instead of shutting off the debate, he went into an explanation to his own men of the expense of power, heat and light, maintenance, repairs, planners and supervisors, and the other functions involved in the making and selling of a product. He got down to actual instances and quoted specific figures. The strike was not called.

"The men," said President Piez, "expressed themselves as satisfied and stayed at work. Perhaps some of them received a larger idea of our burdens and a smaller idea of our profits through the interview."

The strike peril is one of the emergencies which managers sometimes must face. Human nature cannot be standardized as can tools or machine speeds, and the *unexpected* must sometimes be expected in dealing with it.

There are many such variables in factory management both within and without the plant. The vagaries of demand, already discussed, are among the most important. Human nature within the plant is another. Certain types of hazard are always present —breakdowns, accidents, fires; and outside the factory, mine disasters, crop failures, freight tie-ups, a financial crash, a Dayton flood, an Omaha cyclone, a San Francisco earthquake, a European war. The effect on the business may be slight—an interruption of a few hours, days or at the most, weeks. Perhaps a partial shutdown for a month or two may result; perhaps total ruin for the business. In the loosely managed plant, emergencies may arise which are merely retribution for oversights and mistakes. Even in the well managed business, however, there exist these elements which are partially or totally beyond the control of any man. No matter how thoroughly the organization is developed or how carefully the standard instructions are maintained, these conditions cannot be standardized. What can be done in addition to carrying insurance of various sorts, however, is to establish policies and standard methods of guarding against the avoidable, catching the first evidence of the appearance of those tests that must come and throwing the weight of management intelligently against them. Dealing with such situations, more or less serious, is an important part of the manager's work (Figure XXXV).

GOOD ORGANIZATION AND SOUND POLICIES FURNISH INSURANCE AGAINST MOST EMERGENCIES IN BUSINESS

HOW the right background enables the business to brush aside an emergency that appears serious is illustrated by the experience of the Link-Belt's president. That the threatened strike did not materialize was due to the fact that he held the confidence of his men. That he won them by an explanation of overhead, selling expense and profits merely shows how he was able to build upon that confidence and the square dealing on which it in turn rests.

Such management short-circuits many emergencies. The Eastman Kodak Company, evidently in realization of this fact, has organized efficiency clubs among its men. Here the accounts of the various departments are studied in rotation so that each group gets a broader view of the whole manufacturing situation. Publicity of corporation accounts has a value within the plant as well as with the voting and investing public.

Many emergencies could be avoided, had sound management previously prevailed. Buildings designed and constructed strictly in accordance with the principles of fire protection and properly equipped to fight fire, for instance, are almost immune not only against fire, but also against most so-called "acts of God." Systematic upkeep and timely repair of equipment and premises are the best-known insurance against premature deterioration and machinery tie-ups. A spare unit or a supplemental source greatly reduce the risk of a breakdown in power. Machinery maintained up to date, correct manufacturing methods, planned and scheduled operation, scientific purchasing and storekeeping, trained and interested workmen, and good inspection are under most circumstances a positive guaranty of prompt deliveries, uniform quality and mutually satisfactory prices. These measures coupled with a cost system which promptly gives you all the vital facts, are likely to take most of the old-fashioned adventure out of manufacturing, including the red figures on the balance sheet.

To the manager who now faces an emergency due to neglect of these points, this program may seem ill-timed. It has its point, however, in the advice he likes to give his men—"Don't make the same mistake twice"—reorganize to keep clear of those emergencies which grow out of loose management, and through the experience of other managers, standardize your method of considering such emergencies as come in spite of precautions.

EVEN IN THE UNAVOIDABLE CRISIS, A BUSINESS SOUNDLY BUILT IS OFTEN LITTLE HURT

IN unexpected ways, moreover, a record of good management takes the sting out of threatening situations. When a man high among the executives of the concern—perhaps the chief himself—loses his grip, standard instructions will absorb most of the force of the blow. When labor troubles are in the air, the manager realizes, as at no other time, the value of frank and open dealings between the management and the men. Good working conditions, reasonable hours, fair wages, unrestricted avenues of advancement and broad opportunity to share in the profits, a definite policy and routine for adjusting grievances and a reputation for unflagging interest in the welfare of the men have smoothed away emergencies that seemed insurmountable.

The story is told of "Golden Rule" Jones, who though best

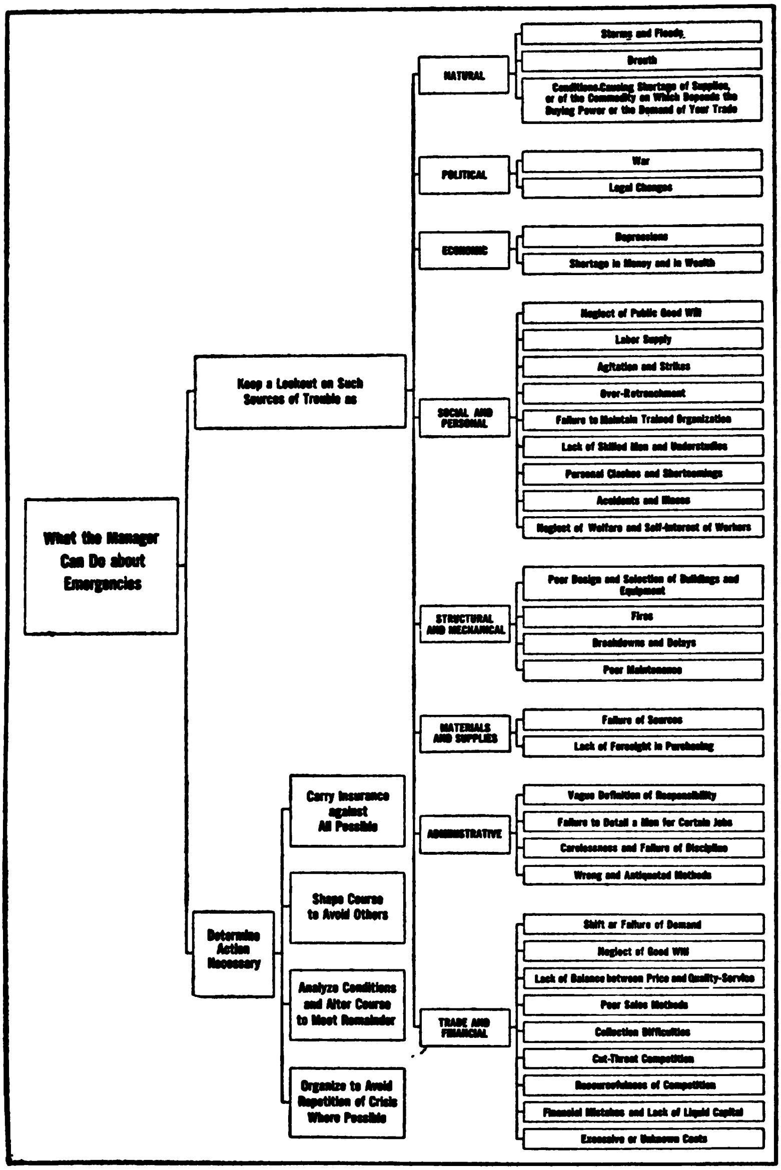

What the Manager Can Do about Emergencies
Keep a Lookout on Such Sources of Trouble as
NATURAL
Storms and Floods
Drouth
Conditions Causing Shortage of Supplies, or of the Commodity on Which Depends the Buying Power or the Demand of Your Trade
POLITICAL
War
Legal Changes
ECONOMIC
Depressions
Shortage in Money and in Wealth
SOCIAL AND PERSONAL
Neglect of Public Good Will
Labor Supply
Agitation and Strikes
Over-Retrenchment
Failure to Maintain Trained Organization
Lack of Skilled Men and Understudies
Personal Clashes and Shortcomings
Accidents and Illness
Neglect of Welfare and Self-Interest of Workers
STRUCTURAL AND MECHANICAL
Poor Design and Selection of Buildings and Equipment
Fires
Breakdowns and Delays
Poor Maintenance
MATERIALS AND SUPPLIES
Failure of Sources
Lack of Foresight in Purchasing
ADMINISTRATIVE
Vague Definition of Responsibility
Failure to Detail a Man for Certain Jobs
Carelessness and Failure of Discipline
Wrong and Antiquated Methods
TRADE AND FINANCIAL
Shift or Failure of Demand
Neglect of Good Will
Lack of Balance between Price and Quality-Service
Poor Sales Methods
Collection Difficulties
Cut-Throat Competition
Resourcefulness of Competition
Financial Mistakes and Lack of Liquid Capital
Excessive or Unknown Costs
Determine Action Necessary
Carry Insurance against All Possible
Shape Course to Avoid Others
Analyze Conditions and Alter Course to Meet Remainder
Organize to Avoid Repetition of Crisis Where Possible

FIGURE XXXV: Emergencies are apparently the last thing against which the manager can predetermine a course of action. Even with these unexpected and uncontrollable factors in business, however, forethought and a definite policy have been found to pay. Sources of trouble can be charted, and the manager who is well organized can go to meet the crisis

known as the "perpetual" mayor of Toledo, was also a manufacturer of note, that when a city-wide strike was in progress a few years ago, his plant was the only one not affected. Yet Jones himself had been dead for over ten years. An investigator inquired of a labor leader why Jones' men had not been called out with the rest. "Well," was the answer, "we never can forget the kind of man he was." What a tribute to the ability of a manager, to his appreciation of the human factor, that ten years after his death his influence was still sufficient to protect his business against a strike, and a city-wide strike at that!

"In my opinion the chief cause of hostility and bad feeling between management and men," declared a Chicago manufacturer recently, "is the usual lack of any means for determining what is right and wrong. The lack, I mean, of a common code or disinterested authority whose judgment is respected by both sides. Disputes once settled, even if one side loses, are seldom the cause of trouble; it is unsettled disputes that are dangerous."

In his own plant, the principles of management which he has tried out and proved efficacious for the prevention and settlement of disputes are these:

(1) A labor department responsible for industrial peace and the good will of the workmen; therefore, of necessity, fully informed as to their sentiments and the organizations, and really representing their interests in the councils of the company.

(2) A means for the prompt and final settlement of all disputes.

(3) Care to maintain conviction in the minds of the men that the management is fair and that all employee interests are safeguarded.

(4) Constant instruction of the leaders and workpeople in the principles of business equity, so that gradually a code is being evolved acceptable by all parties interested, and serviceable as a basis for the adjustment of all difficulties.

(5) The development of efficient representation of all the men in the direction of the plant.

Standing beside the ruins of his plant the day after a conflagration, a tile manufacturer, penniless and in debt, found in the good will of his men a road to renewed success. When he had gathered his men about him and explained that he faced the alternative of abandoning the enterprise, forcing them to sell their homes and seeking work elsewhere; or of borrowing he knew not how in order to rebuild the plant piecemeal, they supplied him out of their savings with the capital which relieved the emergency.

Emergencies that spring from external sources apparently do not submit themselves even thus far to the foresight and control of the manager. The well-managed plant, however, is often found, as if by chance, standing aside from the path of the physical or economic upheaval. John H. Patterson was deemed especially fortunate because the National Cash Register plant stood on a hill safely above the Miami River during the 1914 flood. Foresight in picking a factory location, however, suggests high, well-drained land, both because of the danger of freshets and also because of the health factor.

So in such catastrophes as the Baltimore fire and the San Francisco earthquake and fire, those alone who in building had carefully heeded the experience of other builders, escaped without serious damage, or at least without total ruin. Reinforced concrete buildings, or steel frame, fire-proofed with concrete, when all openings are properly safeguarded and inflammable materials are eschewed in furnishing, are not only ample insurance against fire outside as well as within, but have also resisted most ordinary seismic shocks and wind storms.

GETTING THROUGH AN EMERGENCY—THE TEST OF A MANAGER'S RESOURCEFULNESS

EVEN in the best managed" enterprises, however, the unexpected will still happen both within and without. Among the danger points are threatened loss of authority, labor troubles, stoppage of materials or novel flaws in their composition, and trade and financial difficulties due to unfavorable conditions throughout the land.

Proper management holds such emergencies down to the minimum. When the call comes, moreover, the manager, through his established freedom from detail, his attention to his own efficiency and his clear-cut methods of thinking out management problems under the guiding experience of other managers, is usually in a dominating position. His intuitions are quick and his confidence above worry. However vague or baffling the information to be gained may at first seem, at length he finds the key to the difficulty. The loosely organized plant, led by a detail-ridden manager, lacks confidence in the leader, the organization and the end it serves. Under strong leadership, on the other hand, the organization will not usually suffer as deeply, and its recovery will quickly follow.

How an able executive brought order out of emergency conditions which had long been growing up in one of the largest organizations in this country will illustrate many of these points. An ever-increasing time-lag in getting out specifications and drawings had brought indescribable congestion. Correspondents were clamoring for delivery of orders and production clerks for work for their waiting shop sections. Yet the engineering section seemed utterly incapable of rising to the occasion. Split into six groups, each separately supervised, it had proved its inefficiency. Finally the management, taking the bull by the horns, had consolidated all these little departments into a single large one and had placed at its head the most capable of the six former chiefs.

Thus elevated above his compeers, the new manager had plunged into the task of reorganization with a vigor that promised well. His goal was, with the force at hand, to turn out several times the work they had been doing. From the first he had firmly believed this could be done by a more methodical arrangement and a better system. Six months had passed, however, and now, at the very crest of the company's business, he faced a flat failure.

He had perfected the union of the several departments, eliminated quantities of red tape and greatly simplified the system; yet he had in his department nineteen hundred orders upon which the shop was waiting for information before it could proceed. This was three times the number he should have had. In all the history of the establishment there had never been such a scandal, and the chief could not help but admire the stanchness of the management that had stood behind him so long in the face of this condition. He had no illusions, however, about the length of time his chance could continue. He knew that a month more was about all he could count on. It was up to him to move those orders and move them quickly, otherwise there would soon be a new face at his desk.

He knew, further, where the trouble was. The little force he had brought over with him was working loyally to help him out of the hole. But the rest of the organization, jealous as only men in a big, loosely knit company can be of a success, were chuckling to themselves as they contemplated the impending failure of his plans for reorganization. These were the men who had to do the actual work, and they were hoping that he could not bring them to it. The product of years of selection, the men upon whose brains the company was absolutely dependent for its designs, he could not cure their obstinacy by ordinary means. Their work, moreover, was largely creative—to evolve plans no one else had even thought of—and it was impossible to tell in a given case whether or not a man was remiss because the necessary bright idea did not strike him at once.

Yes, it was out of the question, while resistance was merely passive, to do any wholesale firing. Moreover, so to have done would not have increased the chief's popularity with the rest and would have meant a heavy loss to the company.

Nor were threats effective. For two months or more he had indulged in them freely, without avail. The trouble was not in any positive disobedience of the men, but merely their seeming inability to speed up.

HOW AN EXECUTIVE INVENTED NEW FOLLOW-UP METHODS TO MEET A PRODUCTION CRISIS

ONCE again he went over his analysis of the problem. He had three classes of men to deal with—engineers, draftsmen and clerks. The clerks could easily be dealt with. Their work was tangible—the routine part of handling the orders, and they could be replaced on short notice. The work of the draftsmen was somewhat similar and the chief felt he had that well in hand, too. So the problem was narrowed down to the engineers.

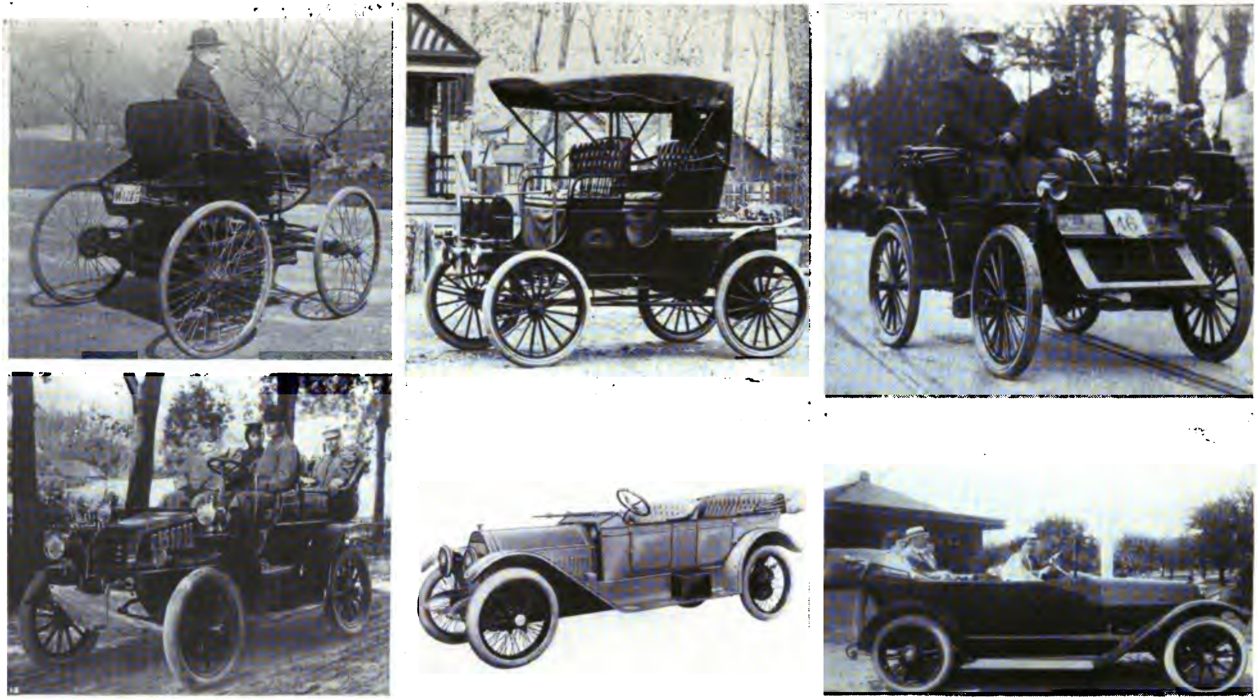
He gave deep thought to the matter. He had observed that whenever he was especially interested in an order and personally followed it through, he got fairly quick action. Thereupon was born in his mind the idea of a personal follow-up and this it was that finally saved him.

Everything depended on the man to head the squad. He must have zeal and persistence without limit, and have the aid of others who were also "stickers." He finally found a young fellow full of the spirit of reform, who readily agreed that for an engineering department to have nineteen hundred orders on hand was a burning shame and a situation that called for his instant attention. A little judicious patting on the back and the prospect of some glory started him on the jump. With a little help, he picked a half dozen men of his own stripe to assist him, and the reform began.

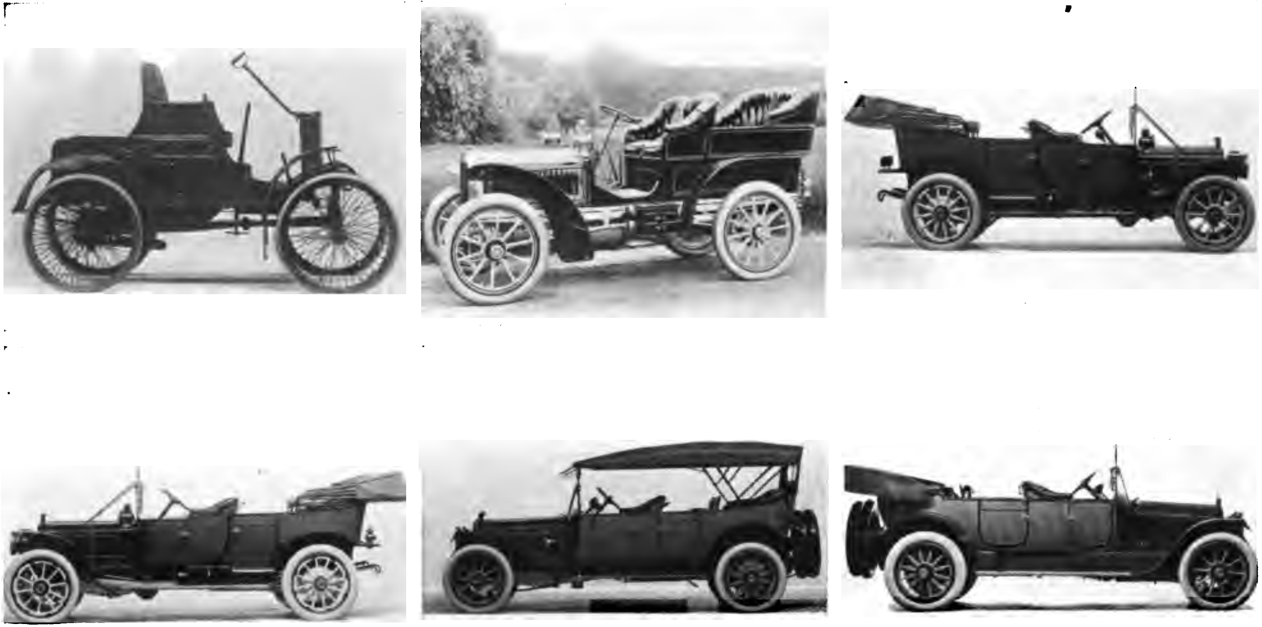
While a somewhat formal name was given to this squad, it was never any other to the force at large than the "Pest Division." Its members had only one idea and that was to get out the orders. Excuses did not interest them, and as they had no productive functions themselves, recriminations did not "go."

Certain machinery was devised to make their work possible. All orders came to them first and two copies were provided for their special use. The original order was hustled to an engineer before it was hardly dry. He was required to sign for it in the messenger's delivery book. These books upon being signed were taken at once to a clerk who operated a numerical file of orders, using one of the special copies. To whom assigned and the time of delivery were posted on the back. Thereafter, as the original order moved forward from station to station within the department, always by messenger, a receipt was obtained each time and the record immediately transferred to the back of the corresponding file copy. Under this plan, the central file always presented an accurate record of the status of each order, which was never more than an hour behind actual deliveries.

The other special copy of the order was put in the hands of the member of the follow-up squad who was actually to follow the order through and who then became responsible for its prompt movements. Of course, it was recognized that instantaneous action was impossible on every order and that there would be many delays. But the follow-up man in each case



How the automobile has kept pace with the demands of its trade is shown on this and the next page. At the left, above, is the first Haynes automobile (1894), and (to the right) its developments, first following the lines of an ordinary carriage (1900), then becoming more original (1901, 1904), and taking on the characteristics of the present-date models (1913-1916)



These views demonstrate further that the head of no manufacturing business can safely consider his original product standard for any length of time in a competitive field The photographs follow the development of the Packard motor car; the first Packard, a single one-cylinder (1899), the first four cylinder (1904), the four "30" (1912), the first "six" (1912), the 1915 "six" and the first "Twin-six" (1916) secured a promise from the engineer stating the length of time he would still require, and on the strength of this, he made his promise to the shop and the sales department. The promise sheet also told approximately what new parts would be required, so that the shop could arrange for such new patterns and tools as would be needed. A copy of this sheet was also attached to the copy of the order in the chief's possession, so that he knew exactly what was expected of the department. Another copy was posted in the numerical file, to enable the man in charge to follow up the "follow-up men" and see that they did not shirk their work. The "Pest Division" thus was enabled to tell any interested party at any moment just what was doing on a certain order and why.

These promises naturally were not always met, but the moral effect was very great and the department speedily began to clear itself. The follow-up men were encouraged to think and act independently, and they made it their business to anticipate fall-downs and prevent them so far as possible by calling in help before they occurred. Failing, they at once told all interested parties and this often gave the salesmen a chance to soften the blow to the customer and usually give a perfectly good excuse, for avoidable delays soon became rare.

Several collateral benefits also materialized. One of these was to curb preference orders. The "Pest Division" soon showed that the course of such orders was strewn with delays to other work and accordingly the practice of issuing them shortly fell into strong disfavor.

Another benefit was to inculcate higher moral standards among the shop clerks. Before the formation of the new division, a clerk's stock excuse for the non-delivery of anything was the failings of the engineers. It was a good excuse, because nobody was in a position to dispute it. The follow-up squad, however, got at the real reasons and made it so unpleasant for the clerks whenever they gave the old excuse wrongly, that they finally came to avoid its use entirely.

A third benefit appeared in the setting of delivery dates by the salesmen. Under the old conditions, the shop "fell down" so regularly that the salesmen had formed the habit of guessing at delivery dates, with some very absurd results. When the planning department began to run on a schedule based on reasonable efficiency, the shop heads found that they in turn could run to schedule and keep their promises, and both departments now promptly repudiated any dates that were not reasonable. The salesmen found it wise to study the matter of dates and ask for delivery estimates before they promised a customer. As a result, better relations were established all around.

A reduction in the number of orders on hand in a few weeks to seven hundred, and a further reduction subsequently, was the direct result of the activities of the follow-up squad. The crest of the business wave that swept the country a few months later found the organization ready, and the engineering department passed through the time of stress without the slightest trouble. The special division organized by the chief to meet the emergency was gradually reduced in size as the engineers became accustomed to working at higher pressure, until at the present time it is relatively unimportant.

In such matter-of-fact ways as this, the resourceful executive can usually devise or adapt methods which conquer the immediate emergency. And having done so, he then takes steps which in a measure make his organization proof to such dangers in the future.

EMERGENCIES, THE OPPORTUNITY OF THE MANAGER WHOSE ORGANIZATION IS STRONG AND SOUND

THE same coolness, ability to analyze, to throw aside traditions, to locate the sources of trouble and to reconstruct the situation enable resourceful managers to make the best of emergencies which are absolutely beyond the control of anyone.

When shipwreck cut off a six months' supply of Swedish iron from a watch factory, the purchasing department by heroic measures developed a domestic source and put an end to the peril. When monopoly threatened its supply of a special oil, the same plant dug out the process involved in making the oil and backed another supplier in its manufacture. When it became impossible in 1914 to secure colors from Germany, one plant which had laid a plan for domestic manufacture on a small scale as a means of steadying the foreign market, developed the process to such a point that, even on a strictly competitive basis, its automatic machinery put the old source permanently out of the running.

Emergencies which have arisen from commercial conditions, legal complications and clashes with state and national authorities have similarly given way before managers who have taken a fresh viewpoint and recognized the full meaning of good will. It is rare even for widespread financial disturbances seriously to embarrass the most astute and courageous manufacturers. The over-cautious manufacturer, always ready to doubt his place in business, may be caught without necessary supplies. The reckless and improvident, too far extended financially, also have reason for uneasiness. But the manager with his organization in hand and ready to fight the harder, finds financial interests as well as widespread good will firmly behind him and frequently makes capital out of the crisis.

When the advertising expenditures of other firms are being curtailed, these executives increase the activity on the firing line. By so doing in 1914 a St. Louis manufacturer was enabled to close the year with the best showing in the history of the enterprise. So, too, when a motor truck manufacturer saw his competitors pushing for war business, he perceived his chance in the neutral foreign market, which he has developed in a permanent way.

Just as the manager needs good organization and standards for routine, so he needs a broad background and philosophy with which to meet emergencies. If he knows both the "why" and the "how" of his business and has studied the experiences of other men who have faced emergencies, few situations will long block his progress.

XII

KEEPING MANAGEMENT POLICIES HEALTHY

ENTERING a metalware factory in Wisconsin, an industrial engineer found two grades of product regularly being put upon the market. "Firsts" were sold under the guaranty and trade-mark of the company. "Seconds" were disposed of anonymously. It was a settled policy so far as possible to take care of the waste from the enameling room by selling as seconds those articles which failed by only a little to pass inspection. Work which was seriously defective of course was culled.

Under this arrangement the percentage of seconds kept climbing until the management was quite ready to believe the engineer's statement that something was wrong.

"And the thing which is wrong fundamentally is not the methods of your workmen," the specialist told the manager; "but the ideal of this corporation. You have laid down the policy of recognizing seconds and of marketing work on which you are not ready to place your brand. Your workmen have naturally accepted this policy and are turning out work of the grade your requirements define. Tolerance of seconds breeds seconds."

Instructions were accordingly drawn up that hereafter seconds should be scrapped. Whatever the factory sold, it was to brand and stand behind. This word went through the shop. Detail policies and reforms in shop methods logically followed. Superintendent, foremen and workmen heard the call of quality and responded. Production of imperfect articles was so far reduced that a definite gain in net profits was scored.

A business policy is a definite course or method adopted by the management for the guidance of those who must act without reasoning back over the whole ground—a rule to secure a desired result under designated conditions. The management has a certain ideal—profits—which it wishes to realize. It recognizes certain conditions which must be met, and a certain standard—the law of compensation or square dealing, without which, most managers will admit, it is impossible to secure permanent success. In order that everyone in the company may have a rule of procedure which will keep to these conditions and tend toward this ideal constantly, avoiding the mistakes and the disregard of principles which in the end are disastrous, the manager lays down his policies. These recognize, for example, that in dealing with his suppliers, his own men, his customers, his competitors and the public, to get something for nothing is impossible, just as to give something for nothing drains the resources.

In the loosely managed concern, policies are not defined and the executives are constantly appealed to for decisions in which they interpret the manager's wishes as best they can. Once these principles are actually fixed, however, the subordinate can apply them and determine for himself what to do in any routine case. Rules, for example, will embody the ideals of the management regarding thoroughness and as to the particular field in which it sees its opportunity. Thus will be determined every detail of cost, quality and service relating to the product.

If the policy is for a low-grade article at a low price with modest limits of service, every case which comes up will be decided in such a way as to avoid by-paths and keep straight for the economy goal. In the Ford plant, when the question of taking over another factory for the production of high-priced cars came up, Ford, with his firm grip upon the policy of the company, vetoed the plan, although it had won support among his executives. Suggestions for expensive refinements in design and attachments have time and again been rejected by the application of the same fundamental policy. Equally sound for their purposes, as indicated by profits and prestige, are the policies of other plants making cars at $1,000, $1,500, $2,500 and $5,000. To have wavered in any particular case, however, would have been to lose the advantage of standard production for one vein of demand and to put the concern at a handicap all along its line, wherever its products met standard competition.

Once a policy is in force, and so long as conditions do not change materially, the task of the management is constantly to refine toward this ideal balance of cost, quality and service—to keep the indicator steady against the cross currents.

DETAIL POLICIES SHOULD GROW OUT OF THE FUNDAMENTAL BALANCE BETWEEN COST AND QUALITY-SERVICE

OUT of the fundamental policy will grow the detail policies of the concern, many of them interpretations of the basic policy by the manager of production, various foremen and even individual workmen. Such policies will cover practically every detail in the business—building construction and maintenance, machinery, tools, requisitions, purchases, stores, wage payment, welfare work, promotion, training, the definition of responsibility, the details of production, cost keeping and cost control.

A policy will indicate whether the company and its head are to be the only public figures, or if the personality of individuals is to be built up and their enthusiasm stimulated by publicity for their personal share in the achievements of the concern. A great corporation has recently decided, for example, that in dealing with householders over a wide territory what it needs to augment its good will is personal contact between each branch manager and his customers. Another policy will determine whether buildings and equipment are to be of the most permanent type or certain makeshifts accepted, in order to maintain more of the capital liquid. If a new product is to be put on the market, policies must be laid down determining discounts and the treatment of dealers, questions of brands and price maintenance and the terms on which competition is to be met. If, for example, the product is a seventy-five cent box of soap, is it to be made better in quality and of the same size as competing packages, is it to be made in three bars somewhat larger, or four bars of equal size?

Such policies, rightly incorporated in the shop instructions and accepted in spirit by the executives, will, as has been said, be followed by all until officially revised. Changes will be unnecessary so long as the aims of the management and the conditions under which the policy was laid down remain constant.

But few conditions are constants. Many of the factors in business must at all times be regarded as variables. Policies, therefore, which were sound and wise when established, soon cease to fit conditions and the times. For every business that suffers because of a too progressive spirit, a score are retarded in their development because of adherence to policies which are out of date. Set up by the founder, perhaps originally the basis of a signal success, such policies are accepted by those who follow him in the management as sufficient and final. Methods are copied long after the reasons for them are forgotten. "How did we do last year?" is still the question when everyone has forgotten *why* it was so done.

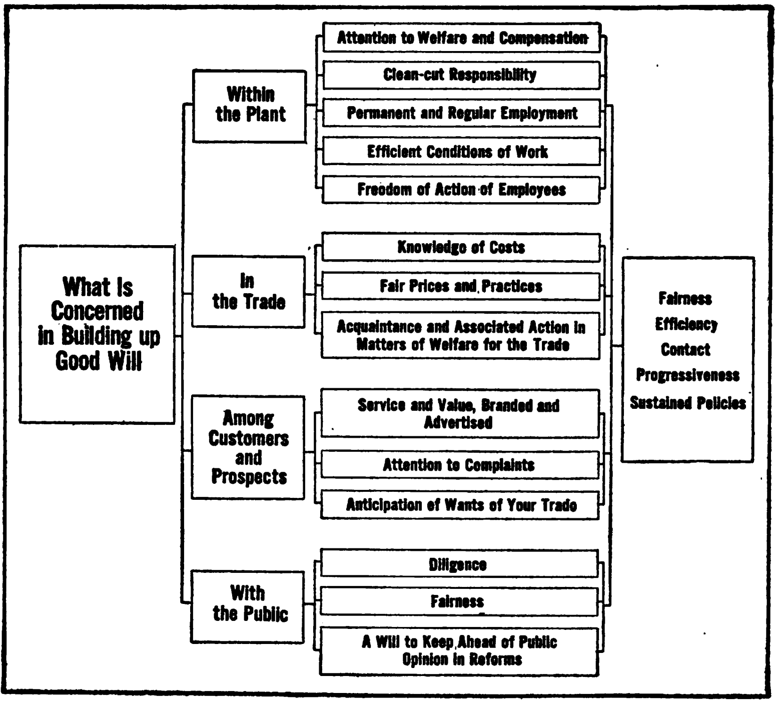

What Is Concerned in Building up Good Will
Within the Plant
Attention to Welfare and Compensation
Clean-cut Responsibility
Permanent and Regular Employment
Efficient Conditions of Work
Freedom of Action of Employees
In the Trade
Knowledge of Costs
Fair Prices and Practices
Acquaintance and Associated Action in Matters of Welfare for the Trade
Among Customers and Prospects
Service and Value, Branded and Advertised
Attention to Complaints
Anticipation of Wants of Your Trade
With the Public
Diligence
Fairness
A Will to Keep Ahead of Public Opinion in Reforms
Fairness
Efficiency
Contact
Progressiveness
Sustained Policies

FIGURE XXXVI: External relations are every day becoming more important to the manager of a business. Good will, in its full meaning, may easily be a true measure of success. A basis of fairness and good will within the plant, among competitors and with the public, as well as with your customers, is a vital consideration in determining the future of every factory

Policies, like price-lists, need revision. They should not be tampered with constantly, but may wisely be scrutinized periodically and corrected on occasion. What is prudent this year, may next year be less prudent; the year after, it may not be prudent at all. If we define management as the art of keeping the business in nice adjustment to conditions and purposes, then this matter of correcting plant policies and formulating new ones as changing conditions bring on the need, is a task of far-sightedness and steadfastness which measures an executive's statesmanship.

The unexpected—the emergency—stimulates the manager to immediate and masterful action. The correction of policies is a task for patience, for keen analysis of the most elusive and perplexing evidence, for the projection of courses of action far into the future, and for decisions which may at first cut deep and tax the faith.

COST, SELLING PRICE AND VOLUME—THE EQUATION ON WHICH THE LIFE OF THE BUSINESS HANGS

WHEN the bicycle gradually went out of fashion, scores of factories faced a fundamental change of conditions. Certain plants with faith in the utility of the bicycle as a tool turned from the pleasure rider to the workman and found a successful field. Other manufacturers applied power to the bicycle and developed the motorcycle. Still others entered the automobile business. And now policies in both fields are again the occasion of anxious thought. Competition in a partially satisfied market, applying standard methods which bring large output and low unit cost, has forced the manufacturer either to emphasize quality and service—the satisfaction of the individual tastes of comparatively few customers as to design, size, power and efficiency; or to enter the fiercely contested price market. And price for the season must be based upon an output and volume of sales so tremendous that it can only be hoped for, not known, till near the close of the year.

These are difficult decisions. The life of the business is involved. If the estimated volume of orders is not realized, the costs in some cases will swallow up the investment. The calculation of possible sales and probable cost, the determination of the guiding policy even one year ahead, is no less difficult a task for the manager than that of keeping level this nice balance, once it has been safely determined.

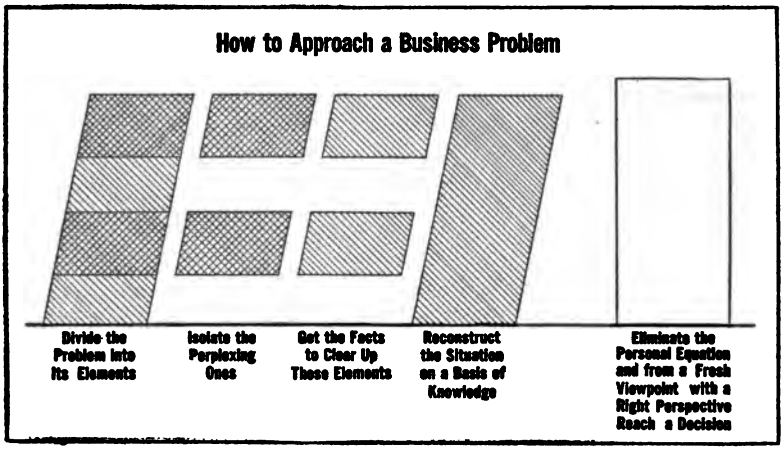

How to Approach a Business Problem
Divide the Problem into Its Elements
Isolate the Perplexing Ones
Get the Facts to Clear Up These Elements
Reconstruct the Situation on a Basis of Knowledge
Eliminate the Personal Equation and from a Fresh Viewpoint with a Right Perspective Reach a Decision

FIGURE XXXVII: When a business problem confronts the manager, his reasoning too often is in a circle. He is unable to get a grip on his problem. How to analyze such questions is here indicated graphically. The first step is to divide the problem into its elements; the next to isolate the most perplexing ones. After analysis come investigation, synthesis and the fresh point of view which clears up all uncertainty

To carry out such analysis and determination of policies and to apply tests for their correction from time to time may involve months or years of study. Data must be accumulated, elaborate shop and sales studies frequently made and, most important of all, knowledge gathered on the deepest social tendencies of the period.

HOW A POLICY OF SAVING THE MEN INCREASED OUTPUT FOUR AND ONE-HALF TIMES

COMPENSATION has been suggested as the principle on which business policies may well rest. The policy as to hours of work illustrates its application. To meet competition on a price basis, managers used to believe, it was necessary to work men the maximum number of hours. Fourteen-hour shifts in the early days were by no means uncommon and the reduction to thirteen in a trade where fourteen prevailed was naturally looked upon as suicidal. Farm hands started their day by lamp light and closed it by star light—why should not factory workers at least use the sun from horizon to horizon?

Logical research and social enlightenment, however, combined in the pressure for shorter hours. Work was divided by thinkers into that which is to some extent recreative and that which is entirely exhausting. Modern machinery made the demands of factory work more than ever exacting. Men were unable to stand the continuous strain of high pressure work; and losses in sickness, in lagging, and in accidents pointed to something wrong in the policies of the management. In great industrial centers, hours had to be shortened because of the distance the workmen came and went.

In such centers, moreover, labor, finding no time left from its work, organized for a shorter day. The public took up the reform and granted legislation in this direction. Such legislation, manufacturers as a rule have opposed by all means at their command, because they felt their very existence to be threatened. Have they been wise in fighting for the long hour? Is this a policy which has been established in a statesmanlike way, on the sound basis of analysis, experience and experiment?

Apparently, to pay a man the same daily wage for nine hours as for ten represents a cash loss of ten per cent of the payroll, which may well neutralize the total net profits of the enterprise. Self-preservation dictates vigorous counter measures against any internal or external force which makes such demands on the factory.

Years of experience, however, have developed the futility of combating these great forces external to a business. Even when managers join hands in associations, they have little chance of stemming the tide.

Moreover, those managers who have looked deeper and have asked not "How long have men always worked?" but "Under what condition can men maintain greatest output?" have found a basis of experience for a new policy.

Years before the organized movement for shorter hours got under way, the superintendent of a Youngstown steel mill, a man noted for his keen human insight, did pioneer work upon this question of policy. He came to the conclusion that twelve hour

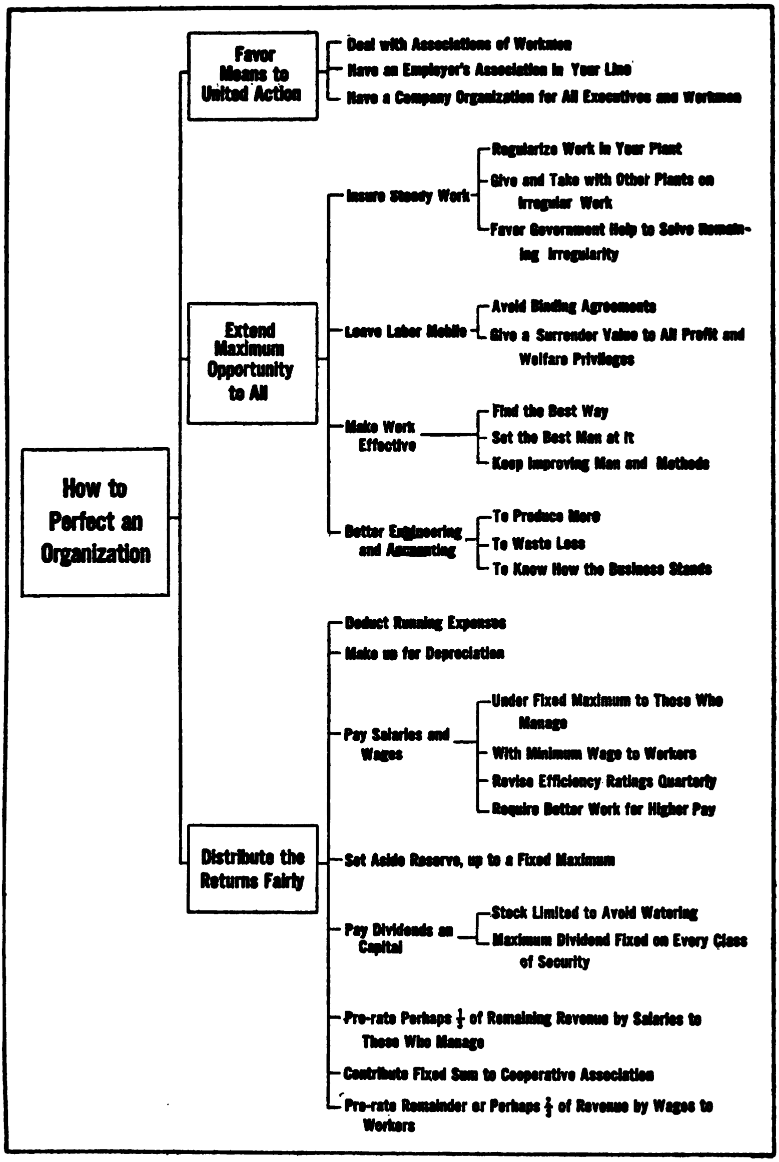

How to Perfect an Organization
Favor Means to United Action
Deal with Associations of Workmen
Have an Employer's Association in Your Line
Have a Company Organization for All Executives and Workmen
Extend Maximum Opportunity to All
Insure Steady Work
Regularize Work in Your Plant
Give and Take with Other Plants on Irregular Work
Favor Government Help to Solve Remaining Irregularity
Leave Labor Mobile
Avoid Binding Agreements
Give a Surrender Value to All Profit and Welfare Privileges
Make Work Effective
Find the Best Way
Set the Best Man at It
Keep Improving Men and Methods
Better Engineering and Accounting
To Produce More
To Waste Less
To Know How the Business Stands
Distribute the Returns Fairly
Deduct Running Expenses
Make up for Depreciation
Pay Salaries and Wages
Under Fixed Maximum to Those Who Manage
With Minimum Wage to Workers
Revise Efficiency Ratings Quarterly
Require Better Work for Higher Pay
Set Aside Reserve, up to a Fixed Maximum
Pay Dividends on Capital
Stock Limited to Avoid Watering
Maximum Dividend Fixed on Every Class of Security
Pro-rate Perhaps ½ of Remaining Revenue by Salaries to Those Who Manage
Contribute Fixed Sum to Cooperative Association
Pro-rate Remainder or Perhaps ½ of Revenue by Wages to Workers

FIGURE XXXVIII: Puzzling industrial tendencies suggest a revision of organization policies in three directions, as here suggested by Robert G. Valentine, Chairman of the First Massachusetts Minimum Wage Board: (1) that capital and management should cease to profit beyond a fixed maximum on which the workers can rely; (2) that profit sharing should supplement wages; (3) that freedom of action and opportunity are essential to content

shifts, then the universal custom in this industry and still largely so, were unwise both from a human and an economic standpoint. With nothing but his own conviction to guide him, he called his men together and announced his new policy. Hereafter, three shifts of eight hours each would be the rule. Equipment—investment—would continue to work twenty-four hours a day. In order that it might work the harder, fresh workmen would "take it on" at eight, four and twelve. Day wages would remain the same, but only on condition that output was maintained.

The first few weeks the men fell a little short of the mark, but before long they began to show increased production. And the output went on increasing until it reached the remarkable total of sixty thousand pounds in eight hours as against forty thousand in the former day, or a total of one hundred and eighty thousand in twenty-four hours as against eighty thousand —an increase of one hundred and twenty-five per cent.

Here was a manager who had not followed precedents, but had interpreted conditions. Common sense told him that a man has so much energy to put into his work and so much recuperative power every hour of leisure. Science has since told us that fatigue is cumulative and that double fatigue requires more than double rest. This manager saw, however, that the last four hours, day after day, were a cumulative drag on the energies of his men. Was it not worth the experiment to remove this friction and allow his men to put the time into recuperation? He decided that it was, and the resulting cost figures made the changed policy as to length of hours a permanent fixture.

Other manufacturers have independently worked out the same change of policy and given the present-day manager a further basis on which to base his decision. Some of these instances have been discussed elsewhere. At Granite City a shortened day so reduced waste and bad work due to negligence and fatigue that this item alone outweighed the twenty per cent increase in the payroll. In the House of Representatives in 1911, Mr. Redfield, later President Wilson's Secretary of Commerce, told how a Brooklyn manufacturer of his acquaintance had become satisfied that the last hour of a ten-hour day was a "tired hour." So he lopped it off. Wages he left as they were. At the end of the year, he found his costs less by nearly five per cent than in any previous year. And, meantime, he had made a measurable increase in output.

By a study of these experiences—and they are reinforced by many others— the manager learns that his policy as to hours of work involves an element more complex than the simple relation of time to output. With the man, as with the machine, not time merely, but speed, power and friction in operation must be considered. And beyond these are endurance and psychological factors.

Far-sighted managers are more and more scrutinizing their relations with society and of their own accord are declaring their independence of tradition in the correction of management policies. Instead of jumping to conclusions on a basis of apparent labor costs, for example, they are looking deeper and considering the cost of dissatisfaction, recuperation, ill will, insubordination and a high rate of labor turnover. To make the most effective use of each hour and each man in the long run is the new criterion.

A manager may go with the current and be recognized as a leader, enjoying the good will of his men and the community; or he may be carried on, resisting and disliked. "To be ahead of both the law and the union standard of hours," is the definite policy in the Cleveland plant of which Richard A. Feiss is the general manager; "Our organization is keyed up to a high pitch and we shouldn't be able to maintain our level if we tolerated any condition that undermined our people's effectiveness. We systematically investigate the causes of inefficiency, and if we find the length of the working day responsible in part, we do not hesitate to shorten it. Our hours are now less than the maximum prescribed by the state for women, and we intend shortly to reduce them still further."

Such a policy not only falls in line with natural forces and principles of efficiency, but also gives the workpeople a feeling that they are employed where standards of hours and pay are voluntarily maintained inferior to none. Mutual respect, cooperation and good will are the natural result, whereas the entire community would discount any concession obviously forced from the management.

How an enlightened labor policy dominates an entire plant and how far it has been wise may be seen also in the experience of another plant. The instance is taken from the enameling industry. Abroad and very generally in this country until recently, as in the steel industry, continuous operation and two twelve-hour shifts under somewhat rigorous conditions have prevailed. In this plant, however, the two-tour plan many years ago gave way to the three-tour one. Wages were not decreased. Instead, it is now by no means uncommon for an enameler to receive from seventy-five to ninety dollars for a month's work. Output meanwhile has gone up and costs down. The result is reduced friction of every sort and the concentration of the force upon actual production.

In the day of twelve hours, eight to ten bath tubs were the normal production for a pair of men. Twice that number are now produced in eight hours and the men have fully one-third of this time to rest. Further improvements in equipment are being worked out, which, it has already been demonstrated, will enable the same men to enamel twenty-four to thirty tubs in eight hours. But they will be kept busy so constantly that it is doubtful whether they can stand the strain. So the policy will be further to shorten the shifts. With a six-hour turn, it is expected that four tubs an hour will prove a reasonable standard. Meantime, it has been the principle of the management constantly to push ahead in the care of its men. Formerly, the intense heat the men had to face and the dust-laden air combined to lower their vitality and require frequent rest periods. Heat curtains have now been built in front of the furnaces, a forced ventilation system provided and hoods connected with the exhaust placed over the enameling cradles. The improvement in the men's efficiency has been very decided.

The results of this management's well-rounded labor policy have been to increase output, decrease costs, shorten the hours of labor, raise wages and promote both the health and contentment of its men. Beyond question, it has laid its course by sound principles of efficiency, rather than precedent and superficial reasoning.

Every policy needs to be brought under this broad test. The question is not whether the method has been profitable in the past nor yet that it seems to be fruitful at present, but is it in harmony with the principles of permanent efficiency and the spirit of the times? Will it in the long run mean progress? As new issues come up, let the manager not refuse to entertain them simply because they are new or because a change of policy involves work and expenditure. Rather let him receive each suggestion with an open mind, subject it to a thorough analysis, and if in his judgment it is sound and wise, adopt or adapt it until the new policy stands or falls by results.

DEVELOPING A HEALTHY SPIRIT OF CRITICISM AND IMPROVEMENT AS A MEANS TO SUSTAINED PROGRESS

ONE manager has instituted the plan of subjecting his policies and methods to a rigorous cross-examination once a year. In the light of profit-and-loss figures, balanced by his perspective, the unproductive is cut away, measures that have been profitable are given more power, rulings are corrected, fresh ideas launched and the new course laid.

Here is a simple, deliberately-planned master policy governing all policies. Put into practice by the heads of any business, it serves a double purpose. It finds the leaks and stops them; it gives headway to the policies that promise profits. Most businesses on the other hand find the leak by chance and scramble to stop the loss by whatever emergency measures are necessary. What is needed, however, is a steady lookout—a fixed policy of checking up policies, methods and results, not merely with respect to trade, but in all the relations within a business and between the business and its community, its associations, organized labor and the public.

Too frequent changes make the whole course of the business wavering and uncertain; but no set of business rules is complete which allows no place and provides no machinery for reconstruction and amendment.

James Hartness, of the Jones and Lamson Machine Company, in his valedictory address as President of the American Society of Mechanical Engineers in January, 1915, recommended that industrial organizations have annually, in addition to a treasurer's or financial report, a *human* report.

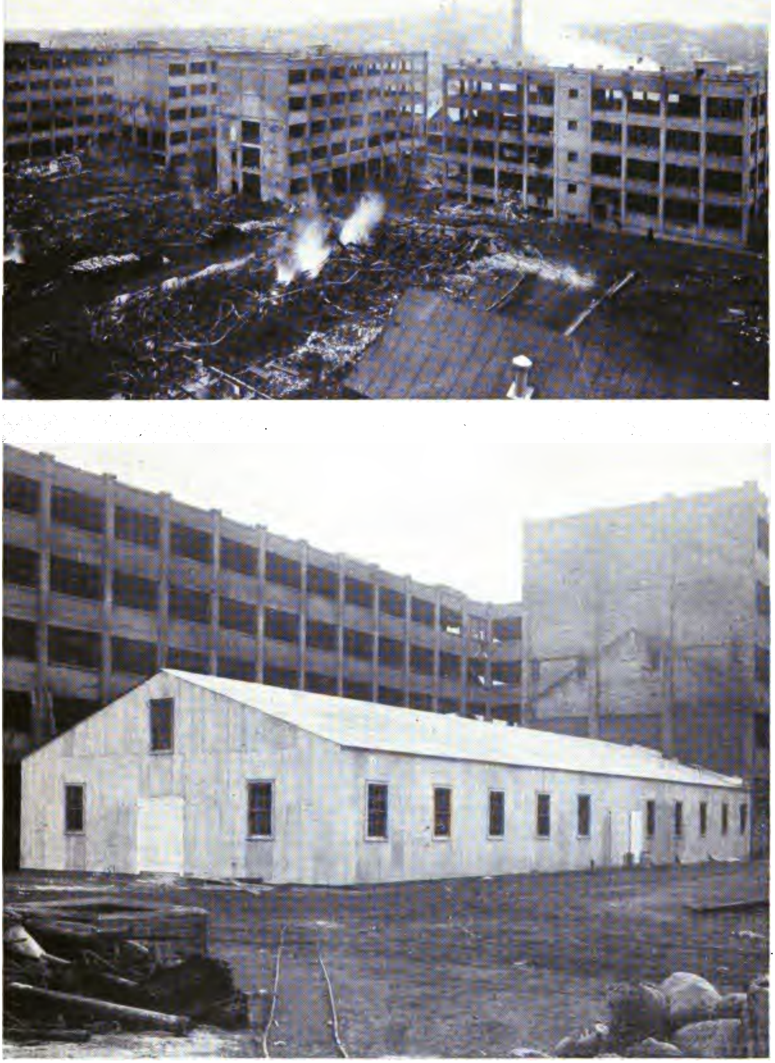
This review would begin with the directors and go through the entire organization. It would include a statement relative to the elements making for harmony in the institution; of the length of service of manager and workmen; the frequency of change in methods or articles manufactured; the intelligence of the executives manifested in the management of the men; the degree of contentment of each member; the extent to which each man in the organization approaches the best position for which he is endowed and how nearly he obtains the best remuneration for which he is qualified; the extent to which the management recognizes the inertia of habit of both mind and body; the degree in which the various men in the organization approximate their highest efficiency; the extent to which the management goes in expression of appreciation; the degree of its knowledge of the most important characteristics of a man as indicated by his inner motives and desires, and the condition of his mind as he goes to his home at night.

"All these elements," said Mr. Hartness, "should be carefully appraised, and the average should be the rating of the company. The investor who considers this human rating, together with the treasurer's statement, will seldom make a mistake in estimating the true worth of an industrial organization.

"May we not hope that the tabulation of these various elements taken from a variety of industries will lead in establishing a standard that will be a guide to both the manager and the investor?

"Surely the investor should look with distrust upon a management that is always changing officers, changing men, changing models, changing methods, without regard to the inertia of habit and the human element which is the life-blood of every organization. He should also look with doubt on any scheme of management which tolerates the careless employment and discharge of men without due regard to the loss involved by such changes, for the perpetual changing of men is equivalent to changing the character of the work itself in its handicap to industrial efficiency."

The business that is willing to submit itself regularly to such an analysis as this and can show a creditable report as to care



How Edison met a gigantic business crisis is indicated (above) in the wreckage of the brick and steel buildings from the fire of December 9, 1914, and the badly riddled concrete buildings; and (below) a new building completed in seven days, of wooden frame and corrugated iron fireproofing, in line with Edison's idea of placing inflammable materials in inexpensive buildings

Usually the man finally responsible for production also shares the responsibility for sales. A corner in the office of one such manager is shown below, with the attendant busy tracing the location and records of the salesmen. To meet the emergency of summer business in war time, an office appliance manufacturer developed the new hand machine shown above of not only investment and dividends, but also plant and equipment, men, materials and methods, has reached the stage of true progress. It has found its line of profit and is hewing to it closely. Going neither too fast nor too slow, it presents a spectacle of coordinated efficiency which should be the goal of every business house. That numerous organizations today are reaching this stage is proof positive of the awakened conscience of the age, the new spirit abroad in the field of enterprise.

The day of simple and unconscious following of tradition in business is passing. The era of self-consciousness, as A. Hamilton Church has called it, is at hand, in which the tendency is to subject every habit and motive to severe scrutiny, to examine afresh every item of daily practice. It is, in some ways, a painful stage to have arrived at. Most of us, as Mr. Church suggests, are so content with our natural innocence that we do not like to part with it; but the process once commenced must continue to the point of conscious and critical efficiency.

"As a consequence of this newly-awakened self-consciousness, managers are beginning to recognize," says Mr. Church, "that production is an aggregate of infinitesimal separate acts, in each of which there are three main components. First, experience must be drawn on fully; secondly, the resulting effort must be intelligently adapted to the end in view; and thirdly, this effort must become habitual. And to secure the successful performance of these acts the living forces concerned must be maintained in the pink of condition, both mental and physical." So then, "the examination into new methods of remunerating labor, the adoption, with caution, of searching instruments of analysis such as time study, the use of precise methods of accounting—these are not causes but rather consequences of the new spirit abroad."

This spirit, moreover, is no less critical of policies as to materials, methods, machines and men, the design and marketing of the product, and the relations of the organization to the outside world, economic, social and political, than it is of minor details. Everything must be done in order by the best known standard, but with care at all times and under all circumstances to be thorough and fair.

Successful policies cannot be founded upon infirmity of purpose, uncertainty in essentials or laxity in control. To observe clearly, to study deeply, to change promptly when your purposes and circumstances so dictate, and always to have a steadying eye and hand upon the main policies of the concern is the true work of management.

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All of the six Factory Management volumes are covered in the following index. For brevity in reference the volumes have been numbered as follows: Buildings and Upkeep, i; Machinery and Equipment, ii; Materials and Supplies, iii; Labor, iv; Operation and Costs, v; Executive Control, vi.

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